

The Waite Group

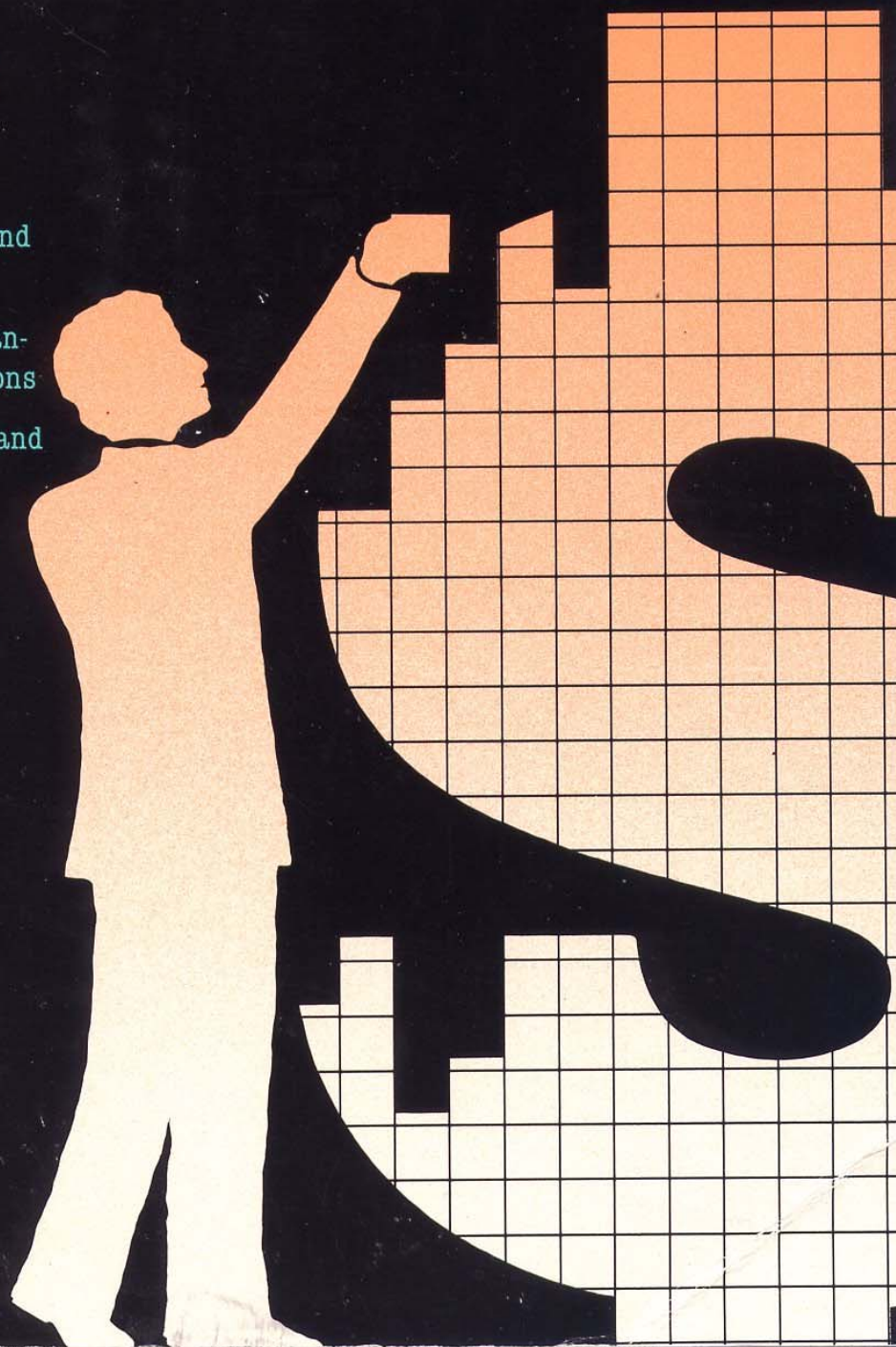

PLUME
WAITE

PRACTICAL FINANCE ON THE TRS-80[®] MODEL 100

A COMPLETE BUSINESS
SOFTWARE SOURCEBOOK

- Includes powerful, practical programs
- Covers interest calculations and investment analysis
- How to manage production planning and real estate calculations
- Create pie charts, bar graphs and Gantt charts
- Explains connecting to online services such as Dow Jones News/Retrieval[®] service and CompuServe[®]

by
S. Venit
and Diane Burns



Another book by the bestselling authors of *ASSEMBLY LANGUAGE PRIMER FOR THE IBM® PC & XT* and *BLUE-BOOK OF ASSEMBLY ROUTINES FOR THE IBM® PC & XT*. . . And rave reviews for The Waite Group:

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PRACTICAL FINANCE

ON THE TRS-80[®]

MODEL 100

by S. Venit
and Diane Burns



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SIGNET, SIGNET CLASSIC, MENTOR, PLUME, MERIDIAN and NAL BOOKS are published *in the United States* by New American Library, 1633 Broadway, New York, New York 10019, *in Canada* by The New American Library of Canada Limited, 81 Mack Avenue, Scarborough, Ontario M1L1M8

Cover design by Michael Manwaring
Illustrations by Winston and Karen Sin
Typography by Walker Graphics

First Printing, November, 1984

1 2 3 4 5 6 7 8 9

PRINTED IN THE UNITED STATES OF AMERICA

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Acknowledgments

We would like to acknowledge the following people without whose help this book could not have been completed: Robert Lafore, Lyn Cordell, Winston and Karen Sin, Lisa Yount, Harry Henderson.

We would also like to thank our readers.

INTRODUCTION

Computers have become an indispensable part of most businesses. They are used to generate financial summaries, to write letters and reports, and to calculate everything from profitability ratios to real estate loan payments.

In the past, the business computer was immobile: it sat on the desk in the office, and, if you wanted to use it, you sat in the office, too. Today, however, a new kind of portable computer — of which the Radio Shack Model 100 is the most popular example — is freeing the computer user from dependence on an immovable office computer system.

The Model 100 is a serious computer with many of the features of full-scale office systems and the power to perform serious business computing, yet it is no larger than a dictionary and weighs considerably less. It is also completely self-contained: it will operate in a car or airplane, or on a construction site. With its built-in software, you can use it immediately for text-editing, as a super-efficient secretary for maintaining your schedule and address book, and as a communications terminal using the phone lines.

Yet for the serious business user these are only the beginning of the Model 100's abilities.

The Ultimate Business Tool

New stories about the Model 100 appear daily. From Maine to Washington, people are using the Model 100 to aid them in their business activities in all kinds of ways. Here are just a few examples.

A retail distributor in New England employs a team of salespersons equipped with Model 100s, combined with a desktop computer system and a host telecommunications program in the home office. Salespeople on the road can dial up the host computer to place orders, leave and pick up messages, and retrieve important client information. The payback: more sales due to more efficient organization.

An equipment leasing company in Texas furnishes its field agents with Model 100s. By using simple BASIC programs, they can provide accurate projections of financing options for their clients on the spot, without having to use cumbersome books of tables and charts. The speed and accuracy of

their calculations instill a sense of confidence in their clients, and the number of signed contracts soars.

Everywhere people in every profession and business field are finding new uses for this amazing machine.

About the Model 100

The Model 100 is a truly revolutionary computer, the closest thing to a businessperson's "dream machine". Built-in programs include BASIC, which can be used to write custom programs tailored to an individual business, and TEXT, which allows for powerful text editing. Text files can be transferred to other computers, to printers, or (via the telephone lines) to other individuals.

The Model 100 contains two other handy programs that offer immeasurable aid in solving the organizational problems of today's businessperson on the go. ADDRSS is an electronic alternative to the traditional "little black book" full of addresses and phone numbers, and SCHEDL replaces those little slips of paper with important reminders of meetings and appointments that always seem to get lost.

Finally, the Model 100 offers a built-in modem and telecommunications program, TELCOM. With this program and the telephone lines, whole new worlds of information will become available to you.

About This Book

If you're in business and you own a Model 100 or are thinking of purchasing one, this book is designed for you. The book presents over sixty simple, practical business application programs that you can use with the Model 100. They cover subjects ranging from interest calculations to portfolio management. Our programs are usually short, since short programs take less time to type in, edit, and debug than long ones; most of the programs in this book are less than thirty lines long, and many are less than twenty. In many cases, the lines typed in one program can be copied into another program using the **PASTE** facility. After reading the introductory material on BASIC and the Model 100 that is presented in Chapter 1, you should be able to type in the programs in the rest of the book and start using them right away to help you manage your business and finances.

Each chapter in this book presents a series of programs related to a single subject. Unless you have more than the minimum 8K memory, you'll probably want to put only one chapter's programs in your machine at a time. You might want to store others on cassette tape, on disk (if you have

the optional disk drive), or in another, larger computer in your home or office. The programs in each chapter are tied together through optional "menu" programs. You can omit particular programs from your menu if you don't plan to use them. If you prefer, you can omit the menu programs entirely and use the other programs individually.

In Chapter 1, we review a few simple BASICs you'll need to know in order to use the rest of the book. You will learn how to type in a BASIC program, edit it, save it, run it, copy it onto a cassette, reload it from tape, and delete it from the computer's memory. You'll also learn some ways to save time and memory space when typing in programs.

In Chapter 2, we'll explore some general application programs that are sure to have many uses in any business. They include programs to produce a pie chart, a bar graph, a line graph, and a sales receipt system. You'll also learn how to use your Model 100 as an alarm clock and a calculator. There's something for everyone here.

If you deal with savings accounts and other financial matters, Chapter 3 is sure to be interesting to you. Programs in this chapter help to determine the future value of a savings account deposit, the total value of a loan at a given rate of interest, the present value of an expected future payment, the interest rate on a loan, and other matters related to interest and money growth.

Chapter 4 offers a simple but complete real estate analysis system that will be useful to anyone who is thinking about buying or selling property. With the programs in this chapter and your Model 100, you can answer almost any mortgage question instantly.

You can create management reports, including an income/expense report and balance sheet summary, by using the programs developed in Chapter 5. This chapter also includes programs that calculate profitability ratios, liquidity ratios, leverage ratios, and activity ratios.

Some handy investment analysis programs are offered in Chapter 6, including bond analysis, stock analysis, return-on-investment analysis, and comparison of several stock offerings. You will also learn how to create a data file where your current portfolio information can be stored.

Chapter 7 presents a few commonly used production analysis programs, including a Gantt chart, depreciation calculations by three different methods, and an inventory maintenance program with a data file.

In Chapter 8, you will learn how you can keep in touch with the world and obtain all kinds of valuable information with a telephone line, your Model 100, and CompuServe Information Service.

Finally, in Chapter 9, you will learn how to dial up Dow Jones News/Retrieval service and obtain many kinds of specific financial and investment information that are likely to be vital to the business of today.

This book does not teach you how to program, nor do you need to be a programmer to use it. If you want to know more about BASIC programming on the Model 100, we suggest that you read *Mastering BASIC on the TRS-80® Model 100* by Bernd Enders (New York: Plume/Waite, New American Library, 1984). If you want to learn the ins and outs of the Model 100 itself, you'll need *Introducing the TRS-80® Model 100* by Diane Burns and S. Venit (New York: Plume/Waite, New American Library, 1984).

The programs in this book are meant to supply practical, usable tools that you'll find helpful in day-to-day business situations. You can use them as they are, or, if you are competent in programming, you can modify them to custom-fit your particular applications. We hope that they'll make your life easier, help to increase your business's efficiency, and make you lots of money!

1

About Our BASIC Programs

BASIC Program Development

- Typing in a BASIC program
- Editing a program
- Coding BASIC as text
- Running a program
- Renaming a file
- Deleting a file

Saving and Loading a Program on Cassette

- Saving a BASIC program
- Saving a BASIC file in TEXT format
- Loading a BASIC file from cassette

Saving Time and Memory Space

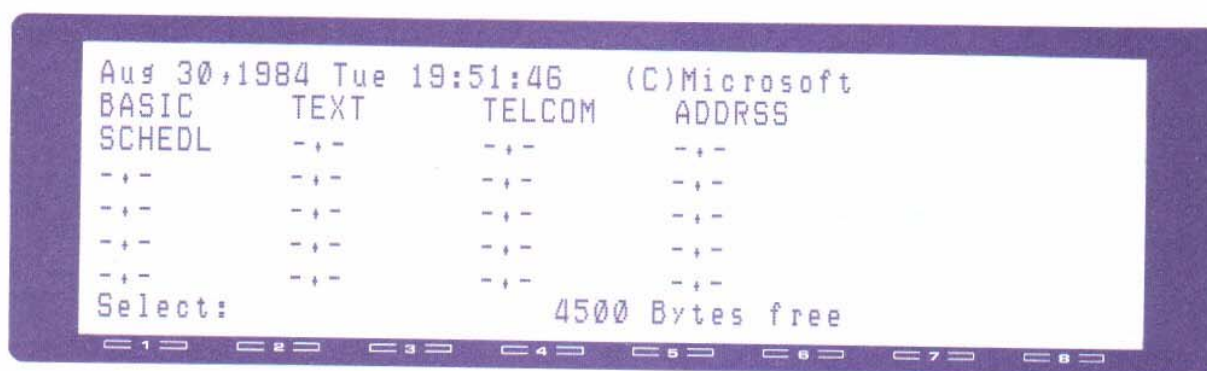
“BASIC?” you may be saying. “I don’t know BASIC. I’m in business, not programming.”

Relax! You can use the programs in this book without knowing anything about BASIC or programming. You do need to know a few simple things about getting programs into and out of the Model 100, though, and this chapter will show them to you. You’ll also learn how to change parts of a program, either to correct typing errors or to modify the program to suit your special needs. (You may think you don’t know enough BASIC to modify a program. As you study the way the programs in this book work, you may find that you’ve learned more about programming than you expected!)

This chapter shows you how to type a program into your Model 100, edit it, run it, store it in memory and on cassette tape, and load it back into the Model 100 from the cassette. You'll need to know these techniques in order to use the programs in this book. You'll also learn some useful ways to save time and memory space when typing in programs.

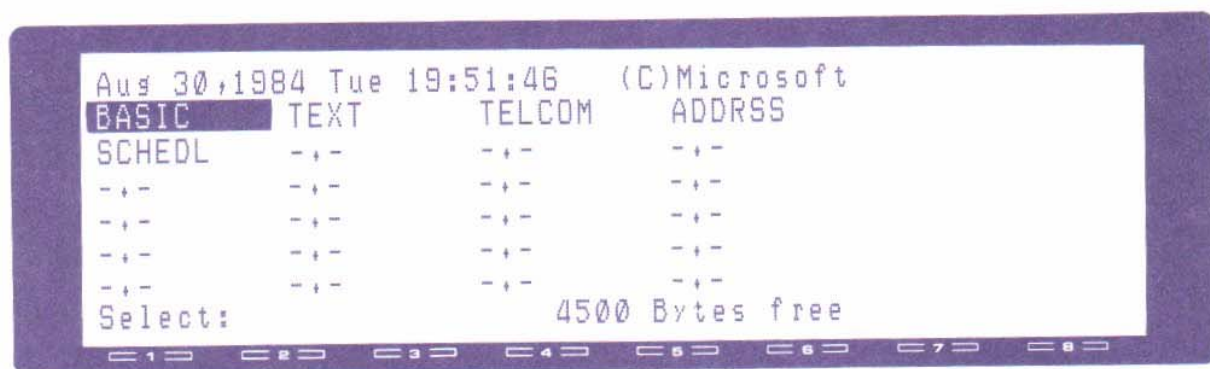
Typing in a BASIC Program

As mentioned in the introduction, the Model 100 comes with five built-in programs. These are listed at the top of the main menu when you first turn the machine on.



The first built-in program, BASIC, is used to create and run other programs. The second program, TEXT, is used to create and edit text. (You can also use the TEXT program to type and edit BASIC programs, as you'll see later in this chapter.) You can save what you type through BASIC or TEXT, giving your work a filename that will be added to the list of files shown on the main menu. We'll describe this process soon.

The most direct method of typing in a BASIC program is to position the cursor over BASIC on the main menu and press **ENTER**. To move the cursor, use the arrow keys on the upper right-hand part of the keyboard: **↑**, **↓**, **→**, **←**.



Once you're in BASIC, simply type each line of the program, being sure to end each line by pressing **ENTER** and to begin each new line with a line number.

Here's a very short program to practice typing in:

```
TRS-80 Model 100 Software
Copr. 1983 Microsoft
4700 Bytes free
OK
10 PRINT"HELLO"
20 FOR N=1 TO 6
30 SOUND 1000*N,5*N
40 NEXT
```

← Start typing here

This program displays the word **HELLO** on the screen and makes six sounds. To run the program once it is typed in, press the function key **F4**.

If you like, you can add more lines to this program, such as:

```
50 PRINT"TODAY'S DATE IS ";DATE$
60 PRINT"THE TIME NOW IS ";TIME$
```

Once you have typed in these numbered lines, they will remain in the BASIC memory until you delete them or replace them. You can press function key **F8** to return to the main menu, and when you return to BASIC (by positioning the cursor over the word **BASIC** and pressing **ENTER**), your program will still be there. You can press function key **F5** to view it.

Saving a File in Memory

If you turn the Model 100 off, the numbered lines will still remain in the BASIC memory. You must save the contents of the BASIC memory into a *named file* before loading or creating another file that might overwrite it — otherwise, it will be lost.

To save the lines typed above, press function key **(F3)** in the BASIC program. The Model 100 will then prompt you for the new filename. (Throughout this book when the machine displays a prompt that requires the user to enter a response the user's response will be underlined so that you can see immediately what is printed by the computer and what you need to type. Of course, this underlining will not appear on the screen of your Model 100). Let's call this file HELLO:

Save "HELLO"

Once you have saved your program this way, it will appear on the main menu with the suffix .BA, indicating that the file is a BASIC program that is ready to run.



Filenames may be up to six characters long and must start with a letter. TEXT files are automatically given the suffix .DO, while BASIC files are given the suffix .BA. The Model 100 enforces this rule — you cannot vary it.

To run a program once it has been saved, simply position the cursor over the name of the file and press **(ENTER)**.

You can use these same steps to type in, save, and run any of the programs in this book.

If you do not save the lines you type in BASIC, they will remain there until they are erased or overwritten by another program that you type in. To erase the current program from memory *without* saving it under its own filename, simply type NEW **(ENTER)** in BASIC. This clears the unsaved program from memory; you can then begin typing lines for a new program. It's a good idea to LIST the current BASIC program by pressing function key **(F5)** before you type NEW, to be sure you are not erasing something you want.

The Function Keys — Common BASIC Commands

Five of the function keys on the Model 100 are programmed to type in the most common programming functions automatically:

- (F1) Files Lists the files stored in memory.
- (F2) Load” Prompts for the name of a program to be loaded. Simply type the name of a saved file and press (ENTER). To cause the program to start running as soon as it is loaded, type: Load“filename”,R
- (F3) Save” Prompts for the name under which to save current program. Save a copy of the program as a text file by typing: Save“filename”,A
- (F4) Run Causes current program to run (you can specify starting line number).
- (F5) List Causes lines of the program to be listed on the screen (you can specify line numbers). Press (PAUSE) to interrupt the scrolling of lines off the top of the screen, then (PAUSE) again to resume scrolling.

Press (SHIFT) (BREAK) or (CTRL) C to stop a running program.

Editing a Program

Suppose you want to add a line to the program you saved as the file HELLO. Begin by positioning the cursor over HELLO.BA on the main menu and pressing (ENTER). The program will run immediately and conclude with the BASIC prompt message: Ok. (You can interrupt the program before it ends by pressing (SHIFT) (BREAK).)

You can list the lines of the program by pressing (F5). The lines of the program will be displayed one by one on the screen.

```
HELLO
Ok
List
10 PRINT"HELLO"
20 FOR N=1 TO 6
30 SOUND 1000*N,5*N
40 NEXT
50 PRINT"TODAY'S DATE IS ";DATE$
60 PRINT"THE TIME NOW IS ";TIME$
Ok
```


If the program is longer than eight lines, the program listing will scroll off the top of the screen as new lines are displayed at the bottom of the screen. You can pause this scrolling process by pressing **PAUSE**. To view more lines of the program, press **PAUSE** again.

You can add a line anywhere in the program by typing a new line number followed by the BASIC instruction. For example, you could type:

```
90 "PRESS ANY KEY TO REPLAY";A$
```

Now run the program with the new line by pressing **F4**.

```
HELLO  
TODAY'S DATE IS 09/29/83  
THE TIME NOW IS 01:23:55  
?SN Error in 90  
OK
```

Oops! Something's gone wrong. The *TRS-80® Model 100 Portable Computer* manual lists thirty-two possible error messages. The most common one for beginners is probably "SN" — a syntax error caused by missing punctuation or some other typographical error. Notice that the error message displayed on the screen gives the number of the line that caused the problem, so you can LIST that line and EDIT it appropriately. The ?SN error message above shows that there is a syntax error in line 90, the line you just typed.

You can look at that line again by typing LIST 90 **ENTER**. On examination, you see that you forgot to type the word INPUT in front of the prompt, "PRESS ANY KEY TO REPLAY". The correct line entry is:

```
90 INPUT"PRESS ANY KEY TO REPLAY";A$
```

You can make this correction by typing the entire line in again. Whenever you type a line number followed by instructions, you replace that line entirely with your new entry. To delete a line, simply type the line number and press **ENTER**.

The One-Line EDIT Command

You can accomplish the same editing job with fewer keystrokes by typing EDIT 90 **ENTER**. When you use this technique, the line numbered 90 is displayed in EDIT mode, and you can insert the word INPUT by typing it after the line number. The EDIT mode in BASIC is the same as TEXT mode — all the same editing procedures apply. (You can read more about TEXT in *Introducing the TRS-80® Model 100* by Diane Burns and S. Venit

[New York: Plume/Waite, New American Library, 1984].) When you are through editing a line or group of lines, press **(F8)** to return to BASIC mode.

BASIC Editing Rules

As you can see, editing a BASIC program is different from editing a normal text file. When you are in BASIC, these rules apply:

- Instructions typed *without a line number* are executed immediately. They are not saved in memory. (Note, however, that some instructions will not work in this “command” mode.)
- Instructions that begin with a *new line number* are added to the other numbered instructions in the memory.
- To *replace* a line, type the line number and the new instruction. When you press **(ENTER)**, the new line will replace the old line with the same number.
- To *edit* a line without retyping it, type EDIT and the line number, then press **(ENTER)**. You can use the arrow keys to move the cursor along the line and make corrections (as described below). When you have completed the edit, press **(F8)** to return to BASIC.

In the EDIT mode, each BASIC instruction is converted to TEXT format. You can then use all the methods of editing described for text. You simply type characters to insert them at the cursor location, use **(DEL/BKSP)** to delete the character to the left of the cursor, and use **(SHIFT) (DEL/BKSP)** to delete the character under the cursor. When you press **(F8)**, the edited lines of text are converted to code again.

You can edit one line, a group of lines, or the whole program at once. For example:

EDIT 10 ← Edit line 10

or

EDIT 10-30 ← Edit lines 10 to 30

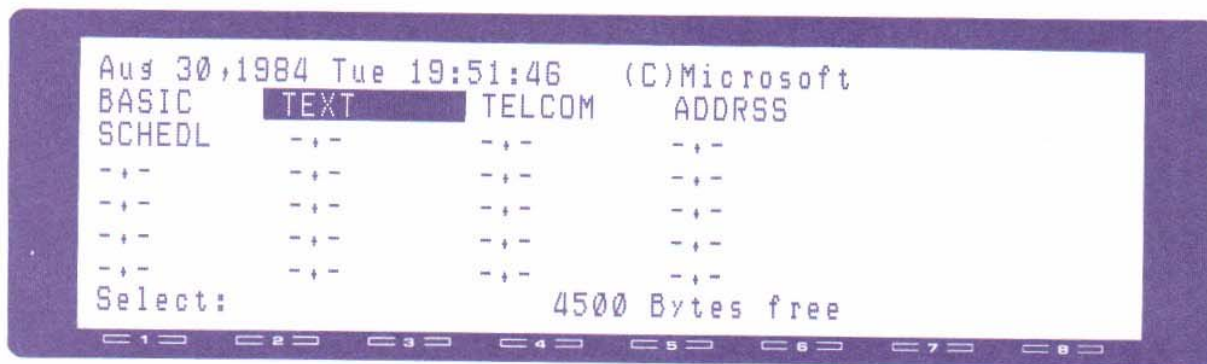
or

EDIT ← Edit entire program

When you finish making changes in EDIT mode, press **(F8)** to return to BASIC mode. The Model 100 will flash the word WAIT on the screen while it converts the lines from text to BASIC code again. When you edit large programs, this waiting period can last several minutes.

Coding BASIC as Text

There is another way to type in a BASIC program. It's a good way to save time when you are typing a long program or a series of similar programs. This is to type the entire program in TEXT mode. This method allows for easy review and correction of errors in a program before it is run in BASIC. To use this method, enter TEXT from the main menu.



When the screen prompts you for a filename, enter the name HELLO, like this:

```
File to edit? HELLO
```

Now you can type the lines of the program as text. (For a complete explanation of all the features in TEXT, see *Introducing the TRS-80® Model 100*.) After typing all or part of the program — whenever you are ready for a test run — press **(F8)** to return to the main menu. Already you may see one advantage to this method: the lines of the program are automatically saved in their own file, named HELLO.DO. You don't have to worry about accidentally typing over them in BASIC.

To run the program, enter BASIC from the main menu, press **(F2)** to load a file, and type the filename HELLO.DO.


```

TRS-80 Model 100 Software
Copr. 1983 Microsoft
4200 Bytes free
Ok
Load "HELLO.DO"
WAIT
Ok

```

The word WAIT flashes as the program lines are “translated” from text to BASIC. This is necessary because text files and BASIC programs are not stored the same way in memory.

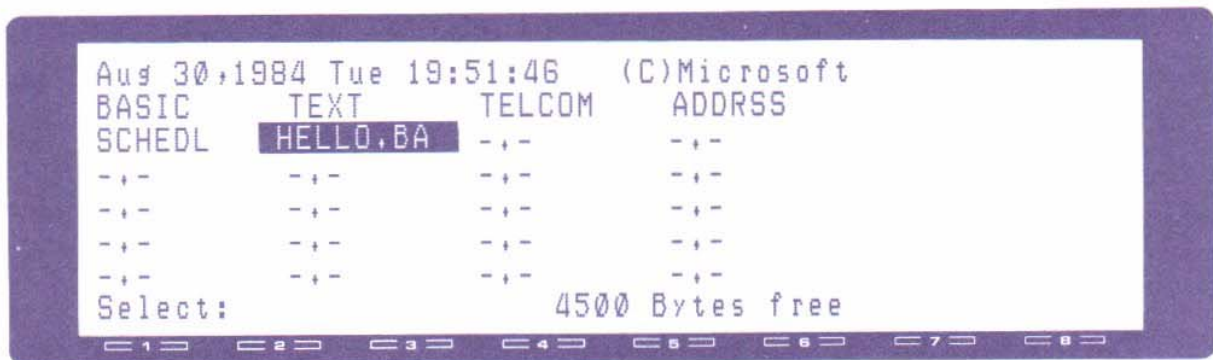
Once the word WAIT stops flashing, the Ok message shows that you are ready to run (or list or save or edit) these lines in BASIC mode. You can make additional edits using the BASIC EDIT mode, or you can make all edits in the HELLO.DO file and reload it to BASIC whenever you want to test the program.

When you are sure that the program works as it is supposed to, you can save the BASIC version and erase the text file (KILL "HELLO.DO"), or you can keep the text version as a working copy to create similar programs. More examples of this approach appear throughout this book.

Running a Program

As you have seen, you can enter BASIC from the main menu, type in a program, and then press **(F4)** to run the program. You’ve also seen that you can save a BASIC program under its own filename or else type it as a text file (with a .DO suffix) and then load it into BASIC.

You can run a program that has been saved under its own filename (with a .BA suffix) by positioning the cursor over the filename and pressing **(ENTER)**.



The program will automatically begin to execute as soon as you press **(ENTER)**. This is the most common method of running typed, saved programs. However, this method does not work with .DO programs.

The following ways of running a program work with *both* .BA and .DO programs. You can run a program by entering BASIC from the main menu and then typing RUN and the name of the program. For example:

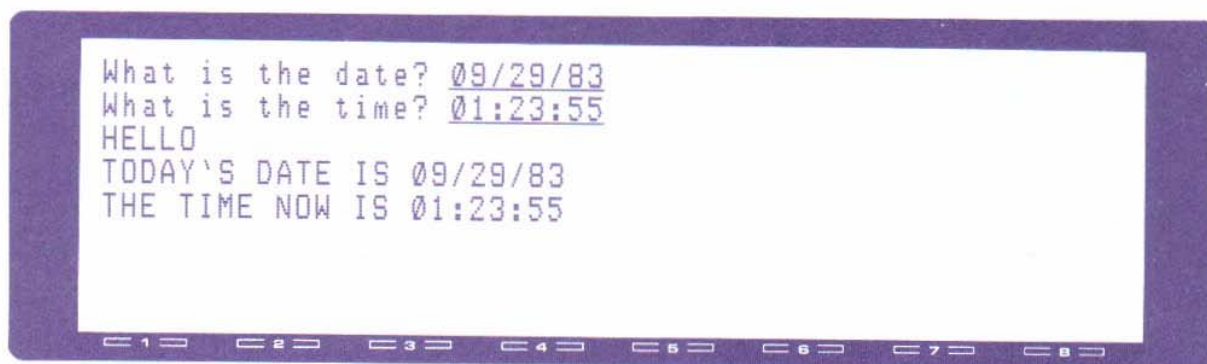
```
RUN "HELLO"
```

You can also use RUN as a numbered instruction in one program to execute another program. For example:

```
10 INPUT "What is the date";DATE$  
20 INPUT "What is the time";TIME$  
30 RUN "HELLO"
```

← Runs program HELLO.BA

If you have already saved a program file named "HELLO.BA", then you can enter BASIC from the main menu, type the three lines shown above, and press **(F4)** (RUN). The screen will display:



Another command that can be used to run one program from another is the LOAD command. Using this instruction, you change the program sequence above to:

```
10 INPUT "What is the date";DATE$  
20 INPUT "What is the time";TIME$  
30 LOAD "HELLO.BA",R
```

← Runs program HELLO.BA

The LOAD command is used in all of the menu programs in this book.

Finally, you can cause a program to run automatically every time you turn the Model 100 on by using the IPL (initial program load) command. For example, you could enter BASIC from the main menu and type:

```
IPL "HELLO,BA"
```

Now, whenever you turn on your Model 100, it will greet you with "HELLO" and tell you the date and time.

No matter which method is used to run a program, "Ok" will be displayed on the screen when the program is finished. You can then use the function keys to list, edit, or run the program again.

Renaming a File

The NAME command changes the name of a file without affecting the file contents. For example, to change the filename "HELLO.BA" to "GREET.BA", type:

```
NAME "HELLO,BA" AS "GREET,BA"
```

The NAME command is used to rename text files as well, for example:

```
NAME "NOTE,DO" AS "DONE,DO"
```

Deleting a File

To clear the current BASIC memory so you can begin typing a new program, simply enter BASIC from the main menu and type:

```
NEW
```

To delete a file saved in memory, use the KILL command. You must enter the full filename, including suffix. For example:

```
KILL "HELLO,BA"
```

or

```
KILL "DONE,DO"
```

Once a file is deleted, of course, you cannot run it or edit it or print it or anything else; it's gone forever. If you need it, don't forget to print it out or save it on cassette or disk before you use the KILL command.

Saving and Loading a Program on Cassette

Since the Model 100 has limited memory storage capacity, you may want to store some of your programs on cassette tape. You need to have a cassette recorder that is designed to be used with a computer. The primary consideration is that the recorder must be able to respond to the BASIC commands "MOTOR ON" and "MOTOR OFF". Follow the manufacturer's instructions for hooking the cassette recorder up to your Model 100 (see Figure 1-1).

After your Model 100 is hooked up to the cassette recorder, place the cursor over BASIC and press **ENTER**. Before you can save the file to cassette, it must be loaded into BASIC. To do this, press **F2**. Then, in response to the prompt "Load", type the name of the file:



Now that your program has been loaded into BASIC, there are two ways of entering the command to save it to cassette tape. One way is to type in the CSAVE command, followed by the name you wish the file to have on the cassette tape.

```
CSAVE "PROGRM"
```

The other way of saving a program on tape is to press the function key **F3** and when you see the prompt "Save", type CAS:, followed by the name you wish the file to have on cassette tape:

```
Save"CAS:PROGRM"
```


Be sure the cassette recording head is positioned over a blank portion of the tape so you don't record over other files on the tape. If you are using audio tape with a leader, make sure the head is past the leader before recording. Press the "record" and "play" buttons down together before entering the "Save" command. You'll know the save is complete when the cursor resumes flashing on the screen and the tape stops turning.

It's a good idea to write down some information on cassette files, such as the number on the cassette counter where the file starts, the name of the file on the Model 100, and the name you give the file on tape.

Saving a BASIC File in TEXT Format

You can also save your BASIC file to cassette in a format that can be used by the TEXT program. Follow the procedures described above, but,

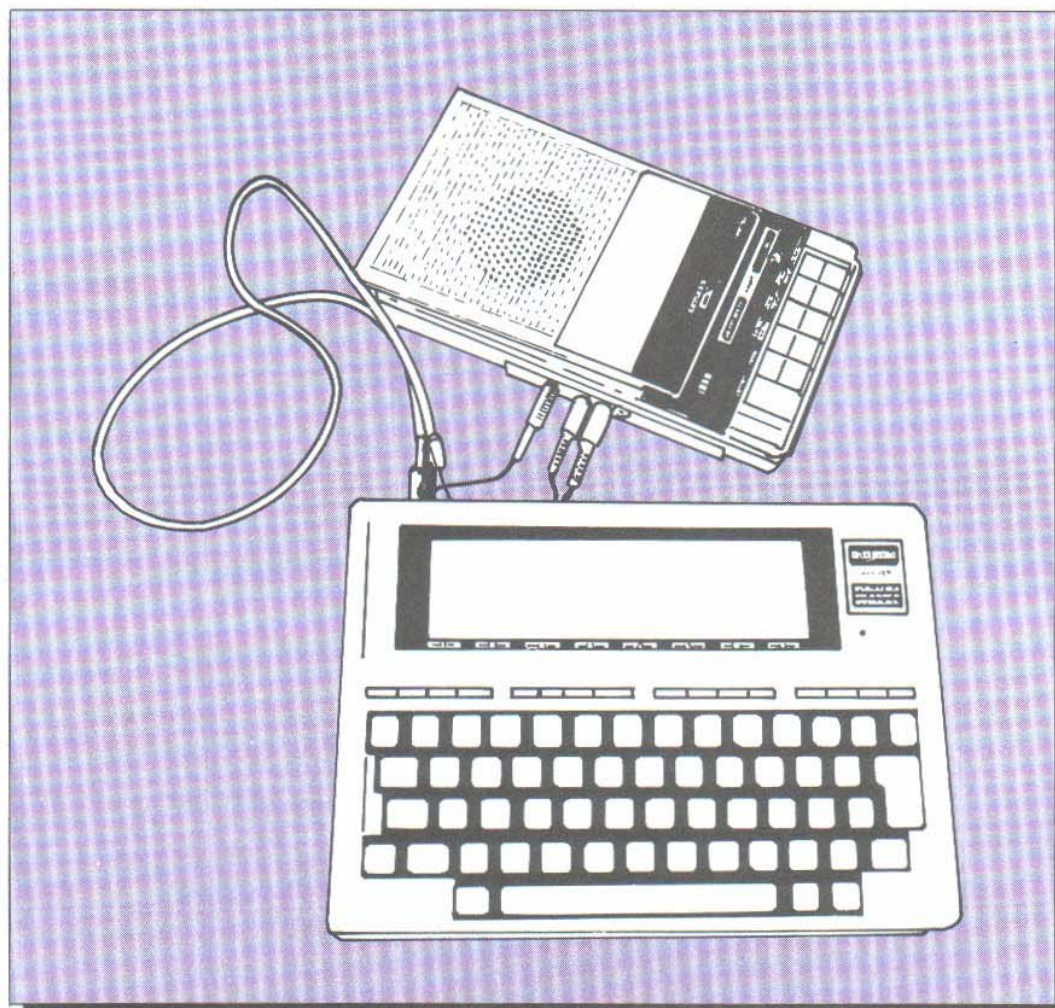


Figure 1-1. Storing files on cassette tape

when you type in the command to save the file, add ",A. For example, you can type:

```
CSAVE "PROGRAM",A
```

Or press **F3** and enter:

```
Save "CAS:PROGRAM",A
```

Loading a BASIC File from Cassette

To load a program from cassette into the Model 100, get into BASIC and type:

```
CLOAD "PROGRAM"
```

Or use the function key **F2**, followed by the letters CAS: and the filename:

```
Load "CAS:PROGRAM"
```

When the recorder finds the file, the bottom line on the screen will change to read:

```
Found: PROGRAM
```

The file is now being loaded from the cassette tape to the Model 100. When the file is completely loaded, you will be in BASIC, ready to run, save, or edit the program.

You can load your BASIC file from the cassette recorder and then run it, all with one command. Follow all of the steps we talked about in the previous section, but, when you type in the command to LOAD or CLOAD the file, add ",R to the entries shown. For example, press **F3** and enter:

```
Load "CAS:PROGRAM",R
```

If you enter the command in this way, your program will run the moment it is completely loaded into the Model 100. Don't forget that you need to save the file in memory before you return to the menu if you don't want to load it again from the cassette.

Another way to run your program immediately after it is loaded is to follow all of the above steps, except that after you enter BASIC, type in the command:

```
RUN "CAS:PROGRAM"
```


Saving Time and Memory Space

A Model 100 with an 8K memory actually contains about 5,000 free bytes. The additional 3,000 bytes are reserved for the Model 100's built-in programs. You can buy additional memory to give you up to 29,000 free bytes on a 32K machine. This is not as much space as a standard 64K microcomputer has, but you can still do a lot with it.

To adapt to this new environment, however, you may have to rethink some traditional programming standards. Long, sophisticated programs that include a lot of remark lines, on-screen help messages, and internal error-trapping routines will exhaust memory space quickly, even on a machine with expanded memory. Here are some memory-saving tips:

Tips for Saving Time and Memory Space

- Omit spaces between words in program lines. This may look funny, but it will save a lot of memory space. The program listings in this book show spaces between words for clarity, but remember that each space you “squeeze out” saves a byte of memory.
- Omit closing quotation marks that occur at the end of lines. Quotes require one byte each.
- Omit remark lines, if you find you can do this without getting confused. One remark line we recommend keeping is the first line of every program, which is a remark with the name of the program. This will make the program easy to identify in print-outs and to distinguish from similar programs.
- Write and edit all programs initially as TEXT files. Load each text file into BASIC to test the program, then save it as a BASIC file and delete the text version (or save the text version for possible future modifications).
- Put more than one program instruction on a line. Line numbers take up space, too!
- For the most part, omit LPRINT instructions, which automatically cause a report to be printed on the printer. Instead, display all information on the Model 100 screen. By simply using the **PRINT** key, you can print out the screen contents whenever you wish.

Incidentally, if the phone rings while you're using your Model 100 and you hang up fifteen minutes later to return to what seems to be a dead computer, don't be alarmed. The Model 100 saves battery power by shutting itself off automatically after about ten minutes of neglect. The screen goes blank, even though the power switch is still set to ON. To restart it, just flip the power switch off, then on again.

Now you know all you need to know to use any program in this book. So much for the BASICS — let's get down to business!

2

Tallies, Tables and Graphs

Some General Application Programs

- An alarm clock
- Simple addition and subtraction
- Hourly wage total
- A simple bar graph
- A line graph
- A pie chart
- A multiple scorekeeper
- Retail sales invoice and tally

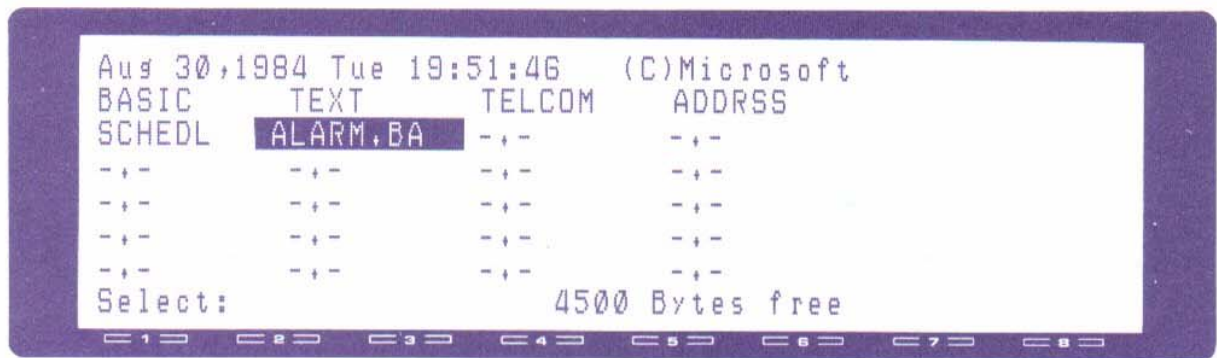
*T*his chapter presents a number of simple programs as an introduction to the more sophisticated programs in the rest of the book. If you need practice typing in and running programs, or if you're curious about how the programs in this book operate, read this chapter and type in the programs. They are short, but interesting and useful, and they embody programming ideas that will be used throughout the following chapters.

An Alarm Clock

Want to be reminded of an appointment? Have trouble keeping meetings to their agreed-on length? Then you might find it useful to turn your Model 100 into an alarm clock. Here's a program that does just that.

Sample Run

We call this program ALARM.BA. Once you've typed it in, you can execute it by positioning the cursor over its program name on the main menu and pressing **ENTER**, just as you would do for any other program with a .BA suffix that is stored in your Model 100.



The program begins by telling you the current time and asking for the alarm time.

```
CURRENT TIME:10:24:57
ALARM TIME? 11:00:00
```

← Enter time in this format

When you enter a time in this program, be sure to use the format shown — six digits, including zeros if necessary, with the digit pair separated by colons. Once the alarm time is entered, the screen clears and displays the current time on line 2, and the alarm setting on line 4. The current time keeps ticking until the alarm time arrives. Then a short alarm sounds, and the screen shows the message: PRESS ANY KEY TO CONTINUE?

```
TIME: 10:25:59
ALARM TIME:11:00:00
PRESS ANY KEY TO CONTINUE?
```

Pressing any key causes the screen to clear and the main menu to return to the screen.

Program Listing

Remember that when you type this program, you can keep spaces for clarity or omit them to save memory space. For example, you could type line 50 as:

```
50 IFTIME$=T$THENG0ELSE40
```

Of course, you should keep the spaces in displayed messages that are shown in quotes, such as "CURRENT TIME:".

Incidentally, when typing in listings, you may notice that some of the lines in our program listings are too long to fit in the forty-column screen of the Model 100 (see lines 30 and 90, for example). There's really no problem here. When you get to the end of the screen, just keep typing, and the line will "wrap around" automatically to the next line on the screen. The BASIC in the Model 100 understands instructions on multiple lines as well as it does those that fit on a single line. To the BASIC program, a "line" ends with a carriage return. Remember that whenever you press **ENTER** at the end of a line, the next line must begin with a new line number.

```
5 REM ALARM.BA
10 PRINT"CURRENT TIME:";TIME$
20 INPUT"ALARM TIME";T$
30 CLS:PRINT@45,"TIME:";PRINT@165,"ALARM TIME:";T$
40 PRINT@51,TIME$
50 IF TIME$=T$ THEN 60 ELSE 40
60 FOR N=1 TO 6
70 SOUND 1000*N,5*N
80 NEXT
90 PRINT@205,"";INPUT"PRESS ENTER TO CONTINUE";A$
100 MENU
```

As you can see, this program uses the variable name TIME\$, which is always stored in the Model 100. The alarm time is input as T\$. The alarm is sounded by the instructions in lines 60-80; you can type your own tune here instead of ours if you wish.

Remember to save this program under the name ALARM, as described in Chapter 1.

Simple Addition and Subtraction

Your versatile Model 100 can become an adding machine as well as an alarm clock. All it needs is this simple program, ADD.BA. (Incidentally, you can rename any of these programs if you wish.) The ADD.BA program prompts the user for a series of values. Entered numbers with no sign are added to the accumulating total, while numbers preceded by a hyphen (minus sign) are subtracted. Whenever the prompt is answered by pressing **ENTER** only, without entering a numeric value, the program displays the subtotal of the current series of entries, along with the accumulating grand total, which includes previous subtotals.

Sample Run

If you type this program into BASIC and test it by putting in a few values and then pressing **(F4)**, the result might look like this:

```
SIMPLE ADDITION (AND SUBTRACTION)
(TO GET TOTAL, PRESS ENTER ONLY)
VALUE? 10
VALUE? 10
VALUE? -5
VALUE? (ENTER)
SUBTOTAL =      15.00
GRAND TOTAL =      15.00
ENTER 1-ADD MORE 2-CLEAR/RETRY 9-EXIT? 1
```

Here the first subtotal is the same as the grand total. At this point, the program offers the options of adding more values, clearing all totals and beginning from zero, or exiting to the main menu. Suppose you select the first option and add a few more figures:

```
SIMPLE ADDITION (AND SUBTRACTION)
(TO GET TOTAL, PRESS ENTER ONLY)
VALUE? 100
VALUE? 5.98
VALUE? (ENTER)
SUBTOTAL =      105.98
GRAND TOTAL =      120.98
ENTER 1-ADD MORE 2-CLEAR/RETRY 9-EXIT? 2
```

The new subtotal shows the total of these new entries, and the grand total includes the previous subtotal. Entering 2-CLEAR/RETRY causes all totals and subtotals to be reset to zero. New entries will begin building a new total. Entering 9=EXIT will exit the program.

In this program, as in all programs in this book, the message "Redo from start" will be displayed if a nonnumeric answer is given to a numeric question. You can simply retype the value.

Once the program runs the way you want it to, save it under the name ADD.BA (or any other name you like). Note that if you start out with 5000 free bytes, the main menu will show that you still have 4609 bytes free after you type in the program. That means that this program uses only 391 bytes of memory!

Program Listing

```
10 REM ADD.BA
20 DEFDBL A-Z:T=0
30 CLS:S=0:PRINT"SIMPLE ADDITION (AND SUBTRACTION)
40 PRINT" (TO GET TOTAL, PRESS ENTER ONLY)
50 FOR I=1 TO 999:V=0
60 INPUT"VALUE";V:S=S+V
70 IF V=0 THEN 80 ELSE NEXT
80 PRINT USING" SUBTOTAL = #####,##";S
90 T=T+S:PRINT USING" GRAND TOTAL = #####,##";T
100 INPUT"ENTER 1-ADD MORE 2-CLEAR/RETRY 9-EXIT";A
110 ON A GOTO 30,20,,,,,,999      ← Note seven commas after 20
999 MENU
```

In this program, the grand total is called T, the current subtotal is S, and individual values are input under the variable name V. If you are going to use numbers with more than two places after the decimal, you can add more #’s after the decimal in lines 80 and 90. You can also add more #’s before the decimal point to handle numbers larger than 999999.

Notice the last three lines in the program listing. These are used in many other programs in this book as a standard method of allowing the user to select from a number of options. The last option is always “9-EXIT”. Typing this returns the user to the main menu, via line 999. Since an ON...GOSUB statement is used to direct the program flow depending on which option is typed, the correct number of commas must be typed in line 110. Count and type them carefully!

Hourly Wage Total

Suppose you want to figure the pay you’d receive for a certain job at a particular hourly rate, or the cost of hiring an employee to do the job. This little wage total program can help you out.

Sample Run

Instead of typing this program directly into BASIC, you might try a different approach. Type the lines of the program in TEXT mode instead, creating a file named WAGES.DO. This way you can easily review the lines and edit them several times before you run the program. To test the lines of code, enter BASIC from the main menu and type RUN“WAGES.DO”. After

a short pause, during which the word WAIT will flash on the screen, you will be presented with a series of questions. If a rate or hours query isn't applicable, press **ENTER**.

```
HOURLY WAGE LOG AND TALLY
HOURLY WAGE RATE? 15
NUMBER OF HOURS AT BASE RATE? 40
OVERTIME RATE (1.50=TIME&HALF)? 1.5
NUMBER OF OVERTIME HOURS? 10
BASE PAY      =      $600.00
OVERTIME PAY =      $225.00
TOTAL PAY     =      $825.00
ENTER 1-REPLAY OR 9-EXIT? 9
```

(Note that the "overtime rate" is the *ratio* of overtime wage to regular wage.) If a rate or hours total isn't applicable just hit **ENTER**.

You might want to add a data file for this program so you can save a record of weekly earnings. Remember to give the data filename a .DO suffix. You'll learn how to create a data file and save data in it when you look at the last program in this chapter.

Program Listing

```
10 REM WAGES.BA
20 DEFDBL A-Z:BW=0:BH=0:OV=0:OH=0:CLS:PRINT"HOURLY WAGE LOG AND TALLY"
30 INPUT" HOURLY WAGE RATE";BW
40 INPUT" NUMBER OF HOURS AT BASE RATE";BH
50 INPUT" OVERTIME RATE (1.50=TIME&HALF)";OV
60 INPUT" NUMBER OF OVERTIME HOURS";OH
70 PRINT USING"BASE PAY      = $$$$$$,##";BH*BW
80 PRINT USING"OVERTIME PAY = $$$$$$,##";BW*OV*OH
90 PRINT USING"TOTAL PAY    = $$$$$$,##";BW*BH+BW*OV*OH
100 INPUT"ENTER 1-REPLAY OR 9-EXIT";A
110 ON A GOTO 20,,,,,,,999
999 MENU
```

← Note 8 commas following 20

A Simple Bar Graph

No matter what business you're in, you're likely to need to produce reports from time to time, and graphs are an important part of most reports. With the right programs, your Model 100 can help you design simple graphs and produce them right along with your text.

Here is a program you can use to create bar graphs. It can display up to six bars, each with a title and a numeric value.

Sample Run

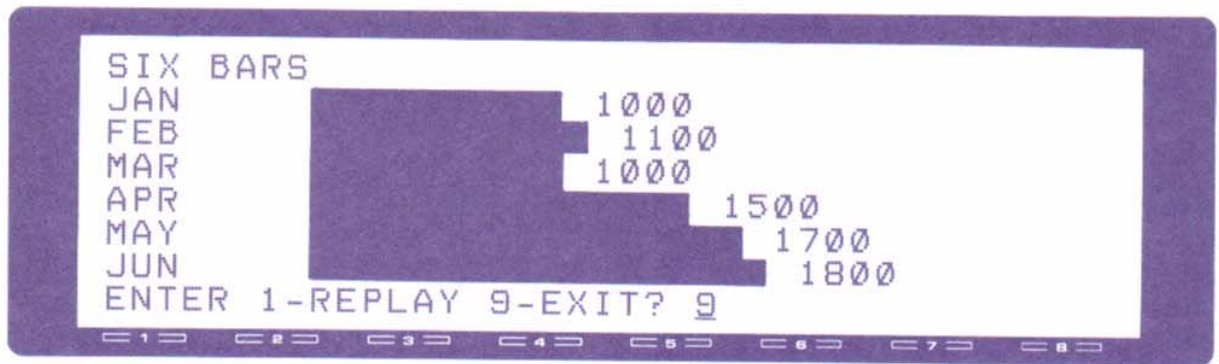
The program BAR.BA begins by prompting with two questions for each of six bars:

```
SIX BARS
BAR 1
  TITLE? JAN
  NUMERIC VALUE? 1000
BAR 2
  TITLE? FEB
  NUMERIC VALUE? 1100
BAR 3
  TITLE? MAR
  NUMERIC VALUE? 1000
BAR 4
  TITLE? APR
  NUMERIC VALUE? 1500
BAR 5
  TITLE? MAY
  NUMERIC VALUE? 1700
BAR 6
  TITLE? JUN
  NUMERIC VALUE? 1800
```

When all the questions have been answered, the screen clears and displays six bars, each labeled with title and numeric value, like this:



As you can see, the program uses X's to draw the bars of the graph. You can use the **PRINT** key to reproduce the graph in this form on paper with your printer. It is possible to make the program display solid bars using the **SHIFT GRPH** X character, but this special character will not print correctly on most printers.



You are offered your choice of both printing methods in the program description that follows.

Program Listing

Typed exactly as shown, the BAR.BA program creates a bar graph using capital X's that can be printed out using the **PRINT** key. Solid bars can be created instead by pressing the keys **SHIFT GRPH** X in place of X in line 130 — that is:

```
130 FOR K=1 TO BV(I)/X:PRINT@(I*40+7+K),"SHIFT GRPHX"BV(I):NEXT K
```

Here is the complete program using X's.

```
10 REM BAR.BA
20 DEFINT A-Z:BV(0)=0:X=1
30 CLS:PRINT"SIX BARS":PRINT
40 FOR I=1 TO 6:BT$="":BV(0)=0:BV(I)=0:PRINT USING"BAR # ";I
50 INPUT" TITLE";BT$(I)
60 INPUT" NUMERIC VALUE";BV(I)
70 IF BV(0)<BV(I) THEN BV(0)=BV(I)
80 NEXT
90 IF BV(0)/X<30 THEN 100 ELSE X=X*10:GOTO 90
100 CLS:PRINT"SIX BARS"
110 FOR I=1 TO 6:PRINT@I*40,BT$(I):NEXT
120 FOR I=1 TO 6
130 FOR K=1 TO BV(I)/X:PRINT@(I*40+7+K),"X"BV(I):NEXT K
140 NEXT I
150 INPUT"ENTER 1-REPLAY 9-EXIT";A
160 ON A GOTO 20,,,,,,999
999 MENU
```

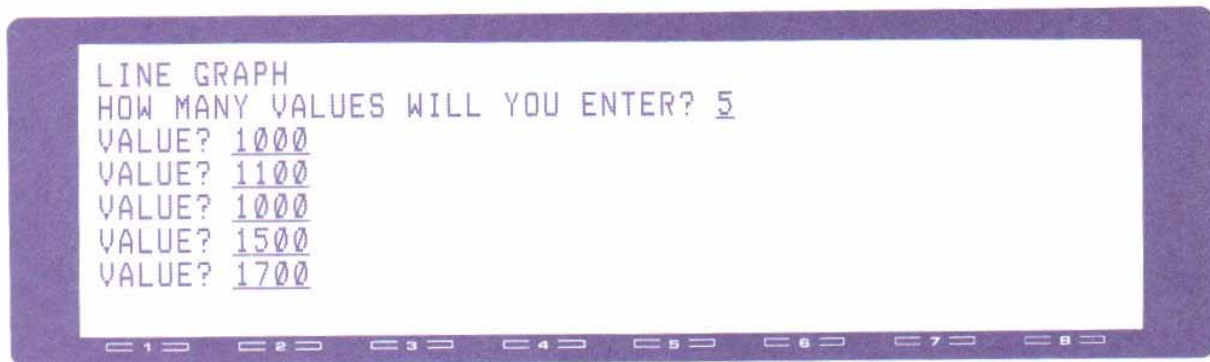
In order to fit any range of values on the screen, a scaling factor has been included in line 90. If the highest value is over 30, then all values are divided by 10 before the bars are drawn. If the highest value divided by 10

is still more than 30, then all values are divided by 100, and so on. If you have less than six values to plot, press **ENTER** for the unused bar titles and values.

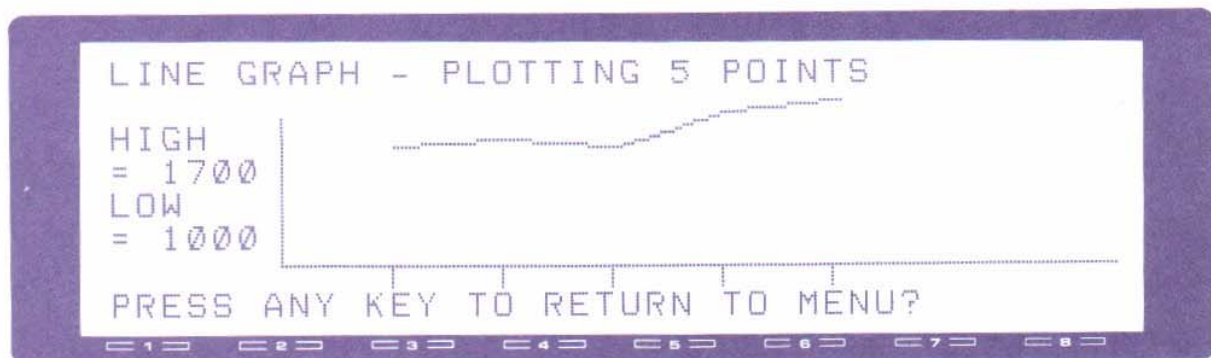
A Line Graph

Line graphs are also useful in reports, for example, to show changes in prices over time. This simple program will accept an almost unlimited number of numeric values in a series, calculate the scale of values relative to the size of the Model 100 screen, and draw a line graph of the plotted points.

Sample Run



After the number of values has been specified and each value has been entered, the program clears the screen and plots the graph. For values of six figures or more, this plotting process will take a few moments while the program scales the values down to fit the Model 100 screen. You can avoid this delay by entering values in thousands (that is, by omitting the last three digits of high values).



By the way, this graph cannot be printed by most printers; the text will print fine, but the plotted points will not print.

Note that you can adapt this program to read something like the FO-LIO.DO file of investment data (described in Chapter 6) and plot it in graphic form.

Program Listing

```
10 REM LINE,BA
20 DEF SNG A-Z:Y=0:X=0:H=0:L=99999
30 CLS:PRINT"LINE GRAPH":PRINT
40 INPUT"HOW MANY VALUES WILL YOU ENTER";N:DIM V(N+1)
50 FOR I=1 TO N:INPUT"VALUE";V(I)
60 IF V(I)>H THEN H=V(I) ELSE 70
70 IF V(I)<L THEN L=V(I) ELSE 80
80 NEXT
90 CLS:PRINT"LINE GRAPH - PLOTTING "N" POINTS
100 Y=Y+1:IF I*Y>150 THEN 110 ELSE 100
110 X=X+1:IF H/X<30 THEN 120 ELSE 110
120 PRINT@40,"":PRINT"HIGH":PRINT"=";INT(H):PRINT"LOW":PRINT"=";INT(L)
130 LINE(40,50)-(40,15):LINE(40,50)-(235,50)
140 FOR I=1 TO N
150 PSET((40+I*Y),(40-V(I)/X))
160 LINE((40+I*Y),48)-((40+I*Y),52):IF I=1 THEN NEXT ELSE 170
170 LINE((40+(I-1)*Y),(40-V(I-1)/X))-((40+I*Y),(40-V(I)/X)):NEXT
180 PRINT@280,"PRESS ANY KEY TO RETURN TO MENU";
190 A$=INKEY$
999 MENU
```

In this program, individual values are stored under the variable name $V(I)$; that is, the first value is $V(1)$, the second value is $V(2)$, and so on. The high value is H , the low value is L . X and Y are used as scaling factors to adjust the values to the Model 100 screen size.

A Pie Chart

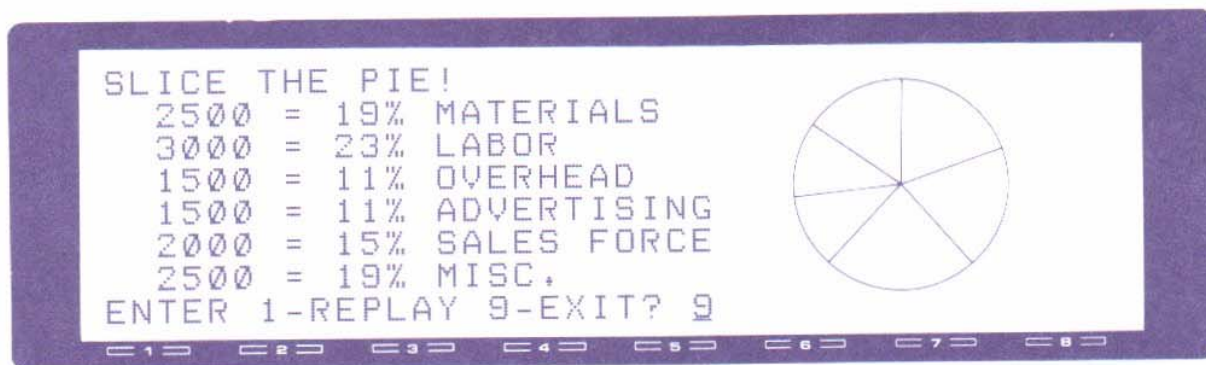
A third useful kind of graph is the pie chart. You might use it, for example, to show the costs involved in producing and selling an item.

Our pie chart program uses the trigonometric functions SIN and COS to draw a circle. Then, with a few modifications, it turns the circle into a pie chart with up to six slices. If you want to input fewer than six values, enter zero as the value for the unused slices.

Sample Run

```
SLICE THE PIE!  
ENTER VALUES FOR UP TO 6 SHARES:  
PIECE 1  
  SHARE ID? MATERIALS  
  SHARE VALUE? 2500  
PIECE 2  
  SHARE ID? LABOR  
  SHARE VALUE? 3000  
PIECE 3  
  SHARE ID? OVERHEAD  
  SHARE VALUE? 1500  
PIECE 4  
  SHARE ID? ADVERTISING  
  SHARE VALUE? 1500  
PIECE 5  
  SHARE ID? SALES FORCE  
  SHARE VALUE? 2000  
PIECE 6  
  SHARE ID? MISCELLANEOUS  
  SHARE VALUE? 2500
```

After all six values have been entered, the program clears the screen, displays a list of the values entered (along with their relative percentages), and draws a pie chart. (Because all six values are converted to integer percentages, they may add up to a few percent less than 100.)



Note that this program, in the form we have written it, includes an optional "whistle": a sound made each time a point is plotted on the circle. Also, note that this graph cannot be printed by most printers; the text will print, but the plotted points will not.

Program Listing

```
10 REM PIE.BA
20 CLEAR:DEFSNG A-Z:R=25:M!=0:SD(0)=0
30 CLS:PRINT"SLICE THE PIE!"
40 PRINT"ENTER VALUES FOR UP TO 6 SHARES:"
50 FOR I=1 TO 6:BT$(I)="":SD(I)=0
60 PRINT USING"PIECE # ";I
70 INPUT" SHARE ID";BT$(I)
80 INPUT" SHARE VALUE";SD(I):SD(0)=SD(0)+SD(I):NEXT I
90 CLS:PRINT"SLICE THE PIE!"
100 FOR I=1 TO 6:P=INT(100*SD(I)/SD(0))
110 PRINT@ (40*I+1),SD(I)
120 PRINT@ (40*I+7),"="P"% "BT$(I):NEXT I
130 A=3.14159/180:X=R*COS(A)+190:Y=R*SIN(A)+30:LINE(190,30)-(X,Y)
140 FOR I=1 TO 6:M!=M!+CSNG(SD(I)/SD(0))
150 FOR D=D TO INT(360*M!) STEP 3
160 A=3.14159/180*D:X=R*COS(A)+190:Y=R*SIN(A)+30
170 PSET(X,Y):SOUND (12000-D*10),1:NEXT D
180 LINE (190,30)-(X,Y):NEXT I
190 INPUT"ENTER 1-REPLAY 9-EXIT";A$:A=VAL(A$)
200 ON A GOTO 10,,,,,,,,,999
999 MENU
```

← Note 8 commas

In this program, the name and value assigned to each pie slice are stored as BT\$(I) and SD(I), respectively. In other words, information about the first pie slice is stored as BT\$(1) and SD(1), information about the second slice as BT\$(2) and SD(2), and so on. The sum of all shares is SD(0). The percentage for each share is P. All other values have to do with plotting a circle with a radius of 25 (assigned in line 20).

A Multiple Scorekeeper

Even the hardest-working businessperson takes some time out for pleasure. If you like to play games during your spare time, just bring your Model 100 with you; this program will make it into the perfect scorekeeper for up to six players. The program will keep a running score and upgrade it every time someone gets more points. You can print out the running totals whenever you want.

When you're ready to go back to work, you'll find that this "scorekeeper" program has many business uses as well. For example, you could use it to tally sales figures for a number of different salespeople or keep track of expenses on several different projects.

Sample Run

SCOREKEEPER

HOW MANY PLAYERS? 6
PLAYER # 1
WHAT IS THIS PLAYER'S NAME? ADAM
PLAYER # 2
WHAT IS THIS PLAYER'S NAME? KATHERINE
PLAYER # 3
WHAT IS THIS PLAYER'S NAME? MADLINE
PLAYER # 4
WHAT IS THIS PLAYER'S NAME? KEN
PLAYER # 5
WHAT IS THIS PLAYER'S NAME? JANICE
PLAYER # 6
WHAT IS THIS PLAYER'S NAME? HARRY
PRESS ANY KEY TO BEGIN KEEPING SCORES?

After all the players' names have been entered, the program prompts for entry of each player's points (sales figures, expenses, or whatever). After each new score is entered, the new total for that player is calculated, and a summary of all players' scores is displayed.

NEXT PLAYER: ADAM
SCORE FOR THIS PLAYER? 10

CURRENT TOTALS
ADAM 10
KATHERINE 0
MADLINE 0
KEN 0
JANICE 0
HARRY 0
NEXT PLAYER: KATHERINE
SCORE FOR THIS PLAYER? 20

CURRENT TOTALS
ADAM 10
KATHERINE 20
MADLINE 0
KEN 0
JANICE 0
HARRY 0
NEXT PLAYER: MADLINE
SCORE FOR THIS PLAYER? 15

You can imagine how the program progresses. When Adam's turn comes again, his second score will be added to his first, and the new total will appear in the CURRENT TOTALS summary. The program goes on until you press **SHIFT** **BREAK**.

Program Listing

In the listing that follows, notice that all variables are defined as integers in line 20. If you want to enter dollar values with cents (or any other decimal measures), change this line to DEFSNG A-Z.

```
10 REM KEEPER.BA
20 DEFINT A-Z
30 CLS:PRINT"SCOREKEEPER":PRINT
40 INPUT"HOW MANY PLAYERS";N:DIM T$(N+1):DIM S(N+1)
50 FOR I=1 TO N:PRINT"PLAYER # ";I:INPUT"WHAT IS THIS PLAYER'S
NAME";T$(I):NEXT
60 PRINT"PRESS ANY KEY TO BEGIN KEEPING SCORES";
65 A$=INKEY$:IF A$=""THEN G5
70 FOR I=1 TO N:PRINT"NEXT PLAYER: ";T$(I)
80 INPUT"SCORE FOR THIS PLAYER";S:S(I)=S(I)+S
90 CLS:PRINT"CURRENT TOTALS:
100 FOR J=1 TO N:PRINT@(J*40),T$(J):PRINT@(J*40+20),S(J):NEXT J
110 NEXT I
120 GOTO 70
```

In this program, the number of players is stored as N, and each player's name and total score are stored as T\$(I) and S(I), respectively.

Retail Sales Invoice and Tally

Whether you sell bubble gum or Rolls Royces, you can get good use out of this program to generate receipts for sales and maintain a tally of daily sales. We think you'll be amazed at how much this program does in just a few lines.

This program does something the earlier ones have not. It creates a separate *data file*. This is a file with the extension .DO. It is stored in memory just like a .BA program. Saving information in a separate file has the advantage that the information is not lost when you run a different program (as it would be with the previous program, KEEPER.BA).

Sample Run

The program begins by prompting for entry of the sale amount, discount percent, and sales tax percent. From this data it calculates the total amount of the sale and offers you the option of saving the information in the SALES.DO data file, which includes one record for each sale.

```
FIRST AND MAIN GENERAL STORE
RETAIL PRICE? 100
DISCOUNT (%)? 10
SALES TAX (%)? 6.5
RETAIL PRICE           $100.00
LESS DISCOUNT         10.00
PLUS SALES TAX          5.85
TOTAL AMOUNT DUE       $95.85
ENTER 1-SAVE 2-RETRY 9-EXIT? 1
ENTER 1-NEXT SALE 2-SUMMARY 9-EXIT? 2
```

If you run this program with your Model 100 connected to a printer, you can press **PRINT** when this screen is displayed and create a printed receipt. When you select the option 1-SAVE, the SALES.DO file is updated, and you have a chance to either continue with more sales transactions or view a summary of all the records in the SALES.DO data file.

```
SALES SUMMARY
$SALE$  $DISC$  $TAX$  $TOTAL$
100.00   10.00   5.85   95.85
200.00   20.00   11.70  191.70
CUMULATIVE SALES TOTAL =    $199.49
ENTER 1-NEXT SALE 2-SUMMARY 9-EXIT? 9
```

The SALE\$\$\$.BA program requires about 1K of memory. The SALES.DO file requires about twenty-five bytes per sale. SALES.DO is a text file that stores each sale's retail total, discount, tax, and net total. In the case illustrated above, the SALES.DO file looks like this:

```
100 , 10 , 5.85 , 95.85
200 , 20 , 11.75 , 191.95
```


Program Listing

```
10 REM SALE$,BA
20 DEFDBL A-Z:CLS:PRINT"FIRST AND MAIN GENERAL STORE"
30 INPUT" RETAIL PRICE";RP
40 INPUT" DISCOUNT (%)" ;DP$:DP=VAL(DP$)/100
50 INPUT" SALES TAX (%)" ;ST$:ST=VAL(ST$)/100
60 PRINT USING"RETAIL PRICE      $$$$$$,,##";RP
70 DV=RP*DP:TV=(RP-DV)*ST:TS=RP-DV+TV
80 PRINT USING"LESS DISCOUNT    $$$$$$,,##";DV
90 PRINT USING"PLUS SALES TAX     $$$$$$,,##";TV
100 PRINT USING"TOTAL AMOUNT DUE  $$$$$$,,##";TS
110 INPUT"ENTER 1-SAVE 2-RETRY 9-EXIT";A
120 ON A GOTO 1000,20,,,,,,999
999 MENU
1000 OPEN"RAM:SALES.DO"FOR APPEND AS 1
1010 PRINT #1,RP","DV","TV","TS:CLOSE 1
1020 INPUT"ENTER 1-NEXT SALE 2-SUMMARY 9-EXIT";A
1030 ON A GOTO 10,3000,,,,,,999
3000 OPEN"RAM:SALES.DO"FOR INPUT AS 1:TS(0)=0
3010 CLS:PRINT"SALES SUMMARY"
3020 PRINT" $SALE$   $DISC$   $TAX$   $TOTAL$"
3030 FOR I=1 TO 5:INPUT #1,RP(I),DV(I),TV(I),TS(I)
3040 PRINT USING"####,##  ";RP(I),DV(I),TV(I),TS(I):TS(0)=TS(0)+TS(I)
3050 IF EOF(1) THEN GOTO 3070 ELSE NEXT
3060 INPUT"PRESS ENTER TO CONTINUE";A$:GOTO 3010
3070 CLOSE
3080 PRINT USING" CUMULATIVE SALES TOTAL = $$$$$$,,##";TS(0)
3090 GOTO 1020
```

This program stores all sales records in the text file SALES.DO, using the variables for the retail value of each sale (RP(I)), the discount amount in dollars (DV(I)), the tax amount in dollars (TV(I)), and the total net amount of the sale (TS(I)).

No doubt you'll be able to think of many uses for the simple programs presented in this chapter. We hope you'll be able to think of even more for the sophisticated programs presented in the following chapters. They relate to a number of different kinds of businesses.

3

Examples of Interest

Interest Programs

- Determine future value of an invested amount
- Determine present value of a future amount
- Determine future value of a series
- Determine present value of a series
- Determine payments required to reach a goal
- Determine interest rate on a loan
- A three-account balance summary
- The money growth menu program

“Neither a borrower nor a lender be” may be good Shakespearian advice, but almost everyone is a borrower or a lender at some time. Borrowing or lending money is almost sure to be part of your life, whether you’re in business or not. Perhaps you’re applying for a loan to buy a home or an office building or to make capital improvements in your factory. Perhaps you’re investing in a stock or a new company or are simply “lending” your money to a bank by putting it into a savings account.

No matter what the amount or purpose of your loan, it’s bound to involve you in interest rate calculations. That’s where your Model 100 and the programs in this chapter can be a lot of help. They let you calculate future values, present values, payments required to meet a goal, and interest rate based on payments.

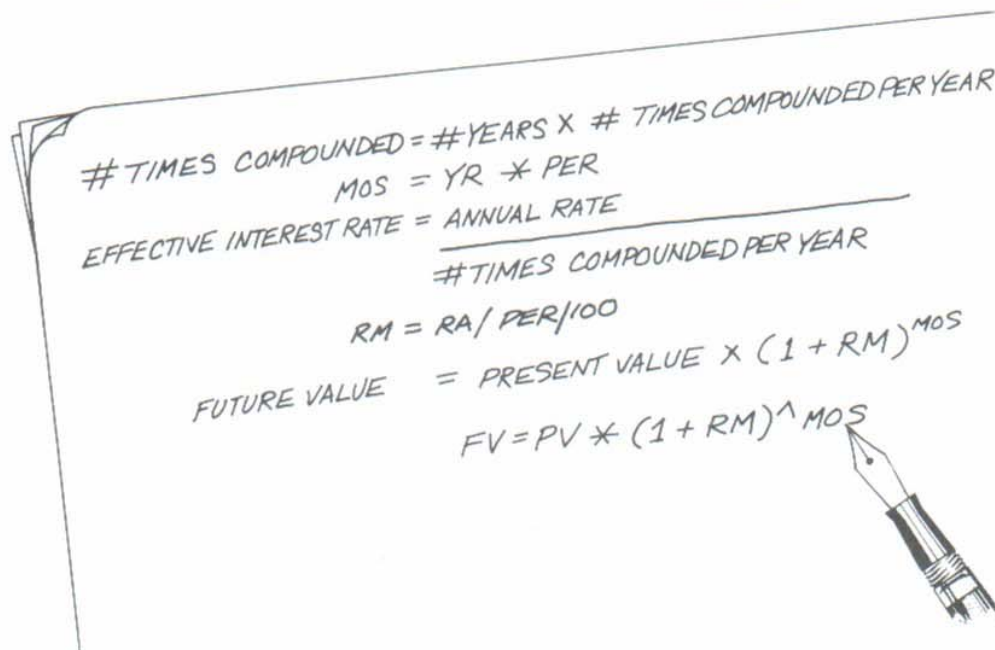
If you work in the banking or real estate field, you will probably want to leave all these programs in your machine permanently so that they will be available whenever you need them. A menu program is included at the end of the chapter to make it easy to select the appropriate program for your particular application.

If you’re new to interest calculations, you might find it useful to look at a few formulas before you examine the programs in this chapter. For ex-

ample, it may help you to know that future value, present value, rate of interest, and length of time all fit together in this formula: $FV = PV(1 + r)^n$.

If your calculation is based on simple interest for one year, the formula is merely $FV = PV(1 + r)$. This means that \$2,500 at 10%, for example, will be worth 110% of \$2,500, or \$2,500 plus 10% of \$2,500. If you want to accrue interest for n years, you need to raise $(1 + r)$ to the n th power. If the interest is compounded more than once a year, you must multiply the number of years times the number of times per year and divide the interest rate by the number of times per year.

Here are some of these formulas for ready reference, with the conventional mathematical notations converted to BASIC.



Handwritten formulas on a notepad:

$$\begin{aligned}\# \text{ TIMES COMPOUNDED} &= \# \text{ YEARS} \times \# \text{ TIMES COMPOUNDED PER YEAR} \\ \text{MOS} &= \text{YR} \times \text{PER} \\ \text{EFFECTIVE INTEREST RATE} &= \frac{\text{ANNUAL RATE}}{\# \text{ TIMES COMPOUNDED PER YEAR}} \\ \text{RM} &= \text{RA} / \text{PER} / 100 \\ \text{FUTURE VALUE} &= \text{PRESENT VALUE} \times (1 + \text{RM})^{\text{MOS}} \\ \text{FV} &= \text{PV} \times (1 + \text{RM})^{\wedge \text{MOS}}\end{aligned}$$

Determine Future Value of an Invested Amount

Our first interest program is the simplest. You can use it to answer the question: "If I deposit an amount in a savings account today at a fixed rate of interest, how much will I have later?" You need to specify the initial amount deposited (present value), the annual interest rate, the investment period (in years), and the number of periods per year (that is, how often the interest is compounded). In this program, as in all programs in this book, the message "Redo from start" is displayed if you enter a nonnumeric response to a numeric question. When you get this message, simply retype the value.

Sample Run

When all questions are answered, the program calculates the results:

DETERMINE FUTURE VALUE OF AN AMOUNT

BASE AMOUNT (PRESENT VALUE)? 2500
ANNUAL INTEREST RATE? 10
INVESTMENT PERIOD (YEARS)? 5
PERIODS PER YEAR? 365
FUTURE AMOUNT WILL BE: \$4,121.52
ENTER 1-REPLAY OR 9-RETURN TO MENU?

Suppose you're an impatient type and want to know how much this same \$2,500 is worth after drawing only one day's interest. Just enter "1" to replay and then answer the questions again, entering the investment period as a fraction of a year ($1/365 = .0027397$):

DETERMINE FUTURE VALUE OF AN AMOUNT

BASE AMOUNT (PRESENT VALUE)? 2500
ANNUAL INTEREST RATE? 10
INVESTMENT PERIOD (YEARS)? .0027397
PERIODS PER YEAR? 365
FUTURE AMOUNT WILL BE: \$2,500.68
ENTER 1-REPLAY OR 9-RETURN TO MENU?

That's sixty-eight cents of easy money!

Program Listing

```
100 REM FUTURE,BA
110 CLS
120 PRINT"DETERMINE FUTURE VALUE OF AN AMOUNT":PRINT
130 INPUT" BASE AMOUNT (PRESENT VALUE)";PV
140 INPUT" ANNUAL INTEREST RATE";RA
150 INPUT" INVESTMENT PERIOD (YEARS)";YR
160 INPUT" PERIODS PER YEAR";PER:GOSUB 1000
170 PRINT USING"FUTURE AMOUNT WILL BE: $#####.##";FV
180 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
190 ON A GOTO 110,,,,,,999
999 MENU
1000 MOS=PER*YR:RM=RA/100/PER:FV=PV*(1+RM)^MOS
1010 RETURN
```


As before, after typing these lines, press **(F3)** to run the program. If any errors are listed, edit the appropriate lines and run again. Remember that you can press **(SHIFT)** **(BREAK)** or **(CTRL)** **C** at any time to exit from the program while it is running. When the program runs as expected, save it under the filename FUTURE.BA.

First, in lines 130-160, the program prompts for the four values it requires, abbreviated as shown below.

PV (present value)

RA (annual interest rate)

YR (investment period in years)

PER (periods per year — number of times compounded)

Next the program jumps to a subroutine (lines 1000-1010) and calculates the following values:

MOS (number of years times number of payments)

RM (rate of interest per period)

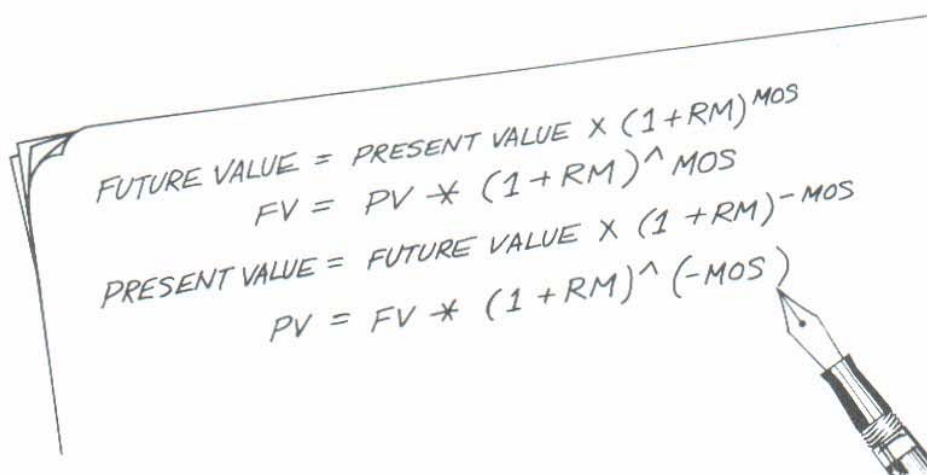
FV (future value)

Finally (line 170) the program displays the calculated future value.

All the rest of the programs in this chapter operate in the same pattern, using the same variable names. Only the input prompts and calculating formulas vary.

Determine Present Value of a Future Amount

If you change just three lines in FUTURE.BA, you will have a program that answers a slightly different question: What is the present value of a future amount?


$$\begin{aligned} \text{FUTURE VALUE} &= \text{PRESENT VALUE} \times (1 + \text{RM})^{\text{MOS}} \\ \text{FV} &= \text{PV} \times (1 + \text{RM})^{\text{MOS}} \\ \text{PRESENT VALUE} &= \text{FUTURE VALUE} \times (1 + \text{RM})^{-\text{MOS}} \\ \text{PV} &= \text{FV} \times (1 + \text{RM})^{(-\text{MOS})} \end{aligned}$$

If you have already typed FUTURE.BA, then follow the steps described below to convert it to PRESNT.BA. This will save you considerable time. If you have not typed FUTURE.BA, you can type PRESNT.BA directly from the listing shown at the end of this section.

Perhaps you want to use this program, but you also want to keep your original FUTURE.BA file exactly as it is. In that case, you'll need to duplicate FUTURE.BA into a second file before making any changes. To do this, enter BASIC from the main menu and press (F2). When the LOAD prompt appears at the bottom of the screen, type:

Load "FUTURE.BA"

This loads FUTURE.BA into the "active" part of memory.

Now press (F3). When the SAVE prompt appears at the bottom of the screen, type:

Save "ACTIVE.DO"

The word WAIT will flash at the bottom of the screen for a few seconds, then the Ok prompt will appear. Press (F8) to return to the menu. It should now show two files: the FUTURE.BA program file and a text file called ACTIVE.DO. If you position the cursor over FUTURE.BA and press (ENTER) now, the program will start running. If you position the cursor over ACTIVE.DO and press (ENTER), the text of the FUTURE program will appear on the screen, and you can edit it using all the normal text editing functions.

To create PRESNT.BA, you need to change only a few lines in the ACTIVE.DO file. For each line you change, change the line number to end in "1" instead of "0". This will help you see the differences between the two programs quickly. For example:

```
100 REM FUTURE.BA
```

was changed to

```
101 REM PRESNT.BA
```

See the program listing at the end of this section for the complete list of lines to change. Any line number ending in "1" marks a changed line.

To test this new version of your program after editing, press (F8) to return to the main menu, then press (ENTER) with the cursor over BASIC. Once in BASIC, press (F2) to load a file and then type:

Load "ACTIVE.DO"

The word WAIT will flash at the bottom of the screen while the text file ACTIVE.DO is converted into BASIC code. When the Ok prompt appears, press (F4) to run the new program. When you are sure the program is running exactly as you expect, save it under the filename PRESENT.BA.

Sample Run

DETERMINE PRESENT VALUE OF FUTURE AMT

FUTURE AMOUNT? 4121.52
ANNUAL INTEREST RATE? 10
INVESTMENT PERIOD (YEARS)? 5
PAYMENTS PER YEAR? 365
PRESENT VALUE IS: \$2,500.00
ENTER 1-REPLAY OR 9-RETURN TO MENU?

Program Listing

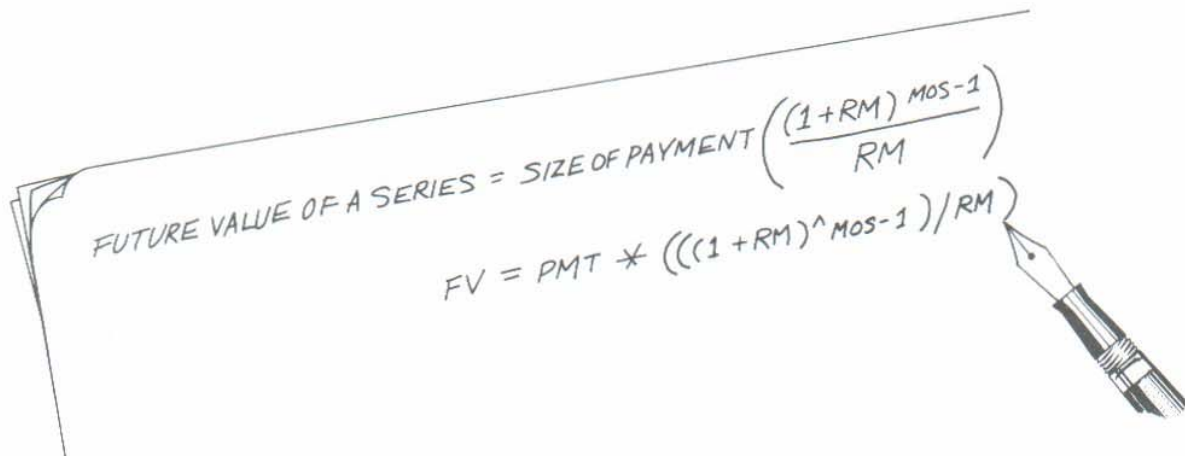
In the listing that follows, lines with numbers ending in 0 are exactly the same as those with the same number in the FUTURE.BA program — they do not need to be edited. Lines with numbers ending in 1 have been modified. They need to be edited or retyped.

```
101 REM PRESENT.BA
110 CLS
121 PRINT"DETERMINE PRESENT VALUE OF FUTURE AMT":PRINT
131 INPUT" FUTURE AMOUNT";FV
140 INPUT" ANNUAL INTEREST RATE";RA
150 INPUT" INVESTMENT PERIOD (YEARS)";YR
161 INPUT" PAYMENTS PER YEAR";PER:GOSUB 1001
171 PRINT USING"PRESENT VALUE IS: $#####.##";PV
180 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
190 ON A GOTO 110,,,,,,,999
999 MENU
1001 MOS=PER*YR:RM=RA/100/PER:PV=FV*(1+RM)^(-MOS)
1010 RETURN
```

Remember to save this file under the name PRESENT.BA.

Determine Future Value of a Series

If your savings come partly from investments, you may need to make a different kind of calculation. It's the future value of a series which can be determined like this:



$$\text{FUTURE VALUE OF A SERIES} = \text{SIZE OF PAYMENT} \left(\frac{(1 + RM)^{MOS-1}}{RM} \right)$$
$$FV = PMT \times (((1 + RM)^{MOS-1}) / RM)$$

For example, suppose you have invested \$500 in Kiwi Resorts, Ltd. You expect that stock to pay you \$50 per year in dividends. You plan to put those dividends into a savings account that pays 12% a year. How much, you may wonder, will you have in twenty years if these figures hold steady?

Sample Run

Here, the amount of each payment is \$50 — the dividend amount expected annually from the Kiwi stock.

DETERMINE FUTURE VALUE OF A SERIES

```
AMOUNT OF EACH PAYMENT? 50
ANNUAL INTEREST RATES? 12
INVESTMENT PERIOD (YEARS)? 20
PAYMENTS PER YEAR? 1
FUTURE AMOUNT WILL BE:      $3,602.62
ENTER 1-REPLAY or 9-RETURN TO MENU?
```

Program Listing

To enter this program, load the text file ACTIVE.DO, which now holds the same code as the program PRESNT.BA. Make changes according to the listing that follows, this time making the numbers of all changed lines end in "2". You can distinguish the FUTURE program (future value of an

amount) from this new program by calling the new program FUTURS (future value of a series of deposits or payments). As before, load the file into BASIC to test it.

In this listing, lines ending in 2 or 3 have been modified from the last program, while lines ending in 0 or 1 were not changed.

```

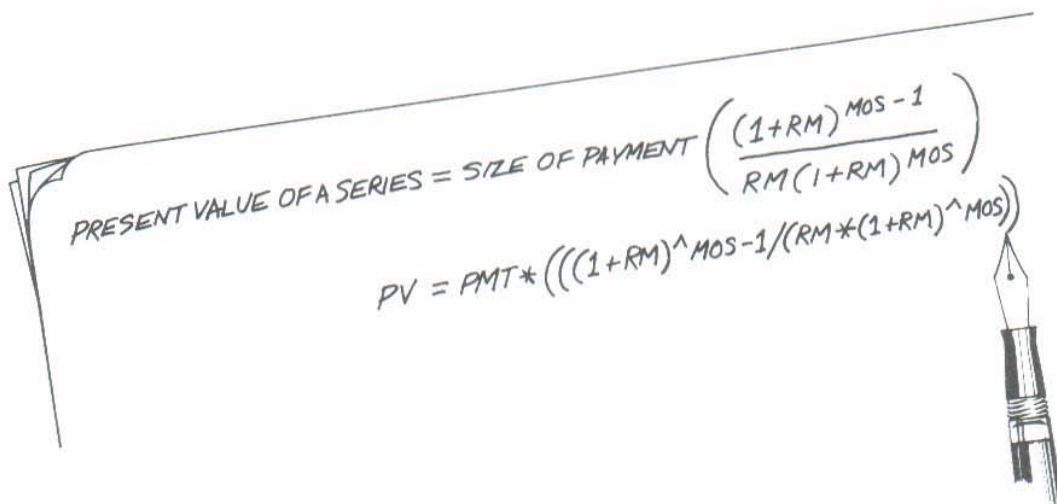
102 REM FUTURS.BA
110 CLS
122 PRINT"DETERMINE FUTURE VALUE OF A SERIES":PRINT
132 INPUT" AMOUNT OF EACH PAYMENT";PMT
140 INPUT" ANNUAL INTEREST RATE";RA
150 INPUT" INVESTMENT PERIOD (YEARS)";YR
162 INPUT" PAYMENTS PER YEAR";PER:GOSUB 1002
172 PRINT USING"FUTURE AMOUNT WILL BE: $$$$$$,,##";FV
180 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
190 ON A GOTO 110,,,,,,999
999 MENU
1002 MOS=PER*YR:RM=RA/100/PER
1003 FV=PMT*(((1+RM)^MOS-1)/RM)
1010 RETURN

```

Here are three more programs that may help you in calculations related to interest and payments. As in the previous examples, each of these programs can be coded simply by making the appropriate changes in the ACTIVE.DO file. They can also be typed in as stand-alone programs if you prefer.

Determine Present Value of a Series

The following formula is used in the next program to calculate the return on an investment made in a series of smaller increments.



PRESENT VALUE OF A SERIES = SIZE OF PAYMENT $\left(\frac{(1+RM)^{MOS}-1}{RM(1+RM)^{MOS}} \right)$

$$PV = PMT * (((1+RM)^{MOS}-1)/(RM*(1+RM)^{MOS}))$$

For example: you buy \$2,500 worth of stock with an expected monthly dividend of \$25. Each month you put these dividends into a savings account at 12% interest. What will the value of this investment be after three years? (To compare this approach with the result of simply placing the whole \$2,500 in savings, return to the first program in this chapter.)

Sample Run

DETERMINE PRESENT VALUE OF A SERIES

```
AMOUNT OF EACH PAYMENT? 25
ANNUAL INTEREST RATE? 12
INVESTMENT PERIOD (YEARS)? 3
PAYMENTS PER YEAR? 12
PRESENT VALUE IS:          $752.69
ENTER 1-REPLAY OR 9-RETURN TO MENU?
```

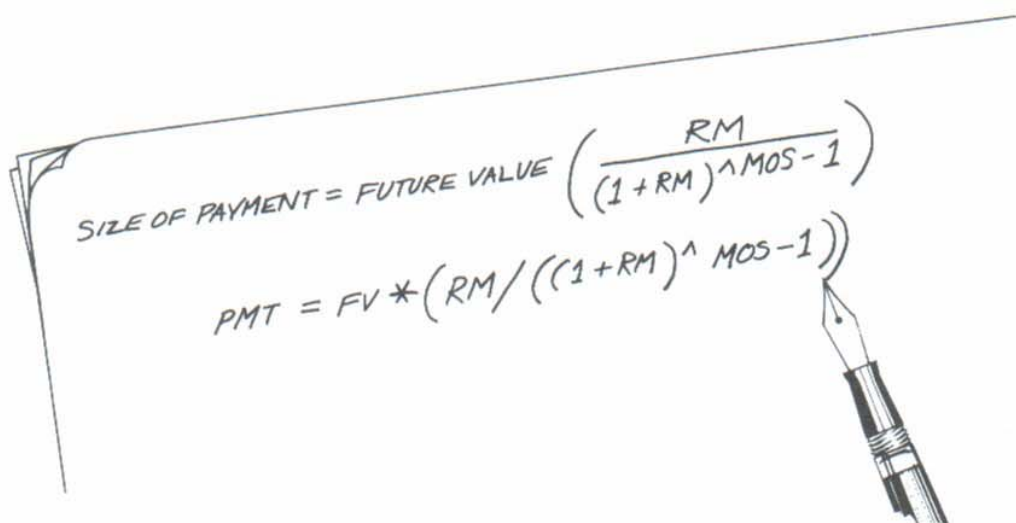
Program Listing

The lines in this program ending in 0, 1, 2, or 3 were not changed in the text file ACTIVE.DO. Changed lines now end in 4 or 5. The edited ACTIVE.DO file was tested and then saved as PRESNS.BA.

```
104 REM PRESNS.BA
110 CLS
124 PRINT "DETERMINE PRESENT VALUE OF A SERIES":PRINT
134 INPUT "AMOUNT OF EACH PAYMENT";PMT
140 INPUT "ANNUAL INTEREST RATE";RA
150 INPUT "INVESTMENT PERIOD (YEARS)";YR
164 INPUT "PAYMENTS PER YEAR";PER:GOSUB 1004
174 PRINT USING "PRESENT VALUE IS:  $#####.##";PV
180 INPUT "ENTER 1-REPLAY OR 9-RETURN TO MENU";A
190 ON A GOTO 110,,,,,,,999
999 MENU
1004 MOS=PER*YR:RM=RA/100/PER
1005 PV=PMT*(((1+RM)^MOS-1)/(RM*(1+RM)^MOS))
1010 RETURN
```

Determine Payments Required to Reach a Goal

This is a sinking fund calculation, hence the program name SINKS. A sinking fund is simply a deposit account into which you make payments until a targeted amount has been reached. For example, you might want to know how much you would have to save each month in an account paying 10% annual interest in order to accumulate \$25,000 for the down payment on a house in five years. Here is the formula used in the program:



A hand-drawn illustration of a notepad with a pen resting on it. The notepad contains two formulas written in a cursive, handwritten style. The first formula is 'SIZE OF PAYMENT = FUTURE VALUE (RM / ((1 + RM) ^ MOS - 1))'. The second formula is 'PMT = FV * (RM / ((1 + RM) ^ MOS - 1))'. The pen is a fountain pen with a nib pointing towards the bottom right of the notepad.

$$\text{SIZE OF PAYMENT} = \text{FUTURE VALUE} \left(\frac{RM}{(1 + RM)^{MOS} - 1} \right)$$
$$PMT = FV * \left(\frac{RM}{(1 + RM)^{MOS} - 1} \right)$$

Sample Run

DETERMINE PAYMENTS REQUIRED FOR GOAL

FUTURE AMOUNT? 25000

ANNUAL INTEREST RATE? 10

INVESTMENT PERIOD (YEARS)? 5

PAYMENTS PER YEAR? 12

PAYMENT MUST BE: \$322.84

ENTER 1-REPLAY OR 9-RETURN TO MENU?

Program Listing

Again, lines in this program ending in 0, 1, 2, 3, 4, or 5 were not changed in the text file ACTIVE.DO. Changed lines end in 6 or 7. The edited ACTIVE.DO file was loaded into BASIC for testing before it was saved as SINKS.BA.

```
106 REM SINKS.BA
110 CLS
126 PRINT"DETERMINE PAYMENTS REQUIRED FOR GOAL":PRINT
136 INPUT" FUTURE AMOUNT";FV
140 INPUT" ANNUAL INTEREST RATE";RA
150 INPUT" INVESTMENT PERIOD (YEARS)";YR
166 INPUT" PAYMENTS PER YEAR";PER:GOSUB 1006
176 PRINT USING"PAYMENT MUST BE:  $#####,.##";PMT
180 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
190 ON A GOTO 110,,,,,,,999
999 MENU
1006 MOS=PER*YR:RM=RA/100/PER
1007 PMT=FV*(RM/((1+RM)^MOS-1))
1010 RETURN
```

Determine Interest Rate on a Loan

Suppose you want to buy a piece of factory equipment that costs \$10,000 and can afford a down payment of \$1,000. You are able to obtain a five-year loan and are told that your payments will be \$250 per month. What interest rate is being charged on the loan?

Sample Run

```
DETERMINE INTEREST RATE OF A LOAN
LOAN AMOUNT? 10000
AMOUNT OF DOWN PAYMENT? 1000
AMOUNT OF EACH PAYMENT? 250
LOAN PERIOD (YEARS)? 5
PAYMENTS PER YEAR? 12
ANNUAL INTEREST RATE:  9.44
ENTER 1-REPLAY OR 9-RETURN TO MENU?
```

Program Listing

Lines ending in 0, 1, 2, 3, 4, 5, 6, or 7 in this program were not changed in the text file ACTIVE.DO. Changed lines now end in 8 or 9.

```
108 REM INTRST.BA
110 CLS
128 PRINT"DETERMINE INTEREST RATE OF A LOAN
129 INPUT" LOAN AMOUNT";PV
138 INPUT" AMOUNT OF DOWN PAYMENT";DN
148 INPUT" AMOUNT OF EACH PAYMENT";PMT
158 INPUT" LOAN PERIOD (YEARS)";YR
168 INPUT" PAYMENTS PER YEAR";PER:GOSUB 1008
178 PRINT USING"ANNUAL INTEREST RATE:  ###,##";RA
180 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
190 ON A GOTO 110,,,,,,,999
999 MENU
1008 MOS=PER*YR:FV=DN+(PMT*MOS)
1009 RA=((FV/PV)^(1/MOS)-1)*100*PER
1010 RETURN
```

A Three-Account Balance Summary

The program in this section, BANKER, shows running balances in three accounts. It can be adapted for any use in which three running balances are desired. It is related to the KEEPER program in the last chapter, but it has been changed significantly to accommodate saving entries in a data file. Note that this program is *not* an adaptation of the ACTIVE.DO file, as are the others in this chapter.

Sample Run

Before you run this program for the first time, you must create a text file named ACCTS.DO. This file may be empty when you begin the program, but after you have run the program once, the information you enter about each account will be stored there.

A brief musical trill that sounds when the following listing is displayed indicates that the information saved in ACCTS.DO has been read by the program. If no account names are listed, the ACCTS.DO file is empty (and the trill is gone).

```

RUNNING BALANCE FOR THREE ACCOUNTS
1-UPDATE ACCOUNT #1-
2-UPDATE ACCOUNT #2-
3-UPDATE ACCOUNT #3-
4-DISPLAY SUMMARY TABLE
9-EXIT
ENTER SELECTION NUMBER? 1

```

In this case, the first entry will update account #1. The program displays whatever information is already stored about account #1 — at present, nothing.

```

UPDATE ACCOUNT # 1 -
CURRENT ACCOUNT BALANCE =           $0.00
LAST ENTRY FOR THIS ACCOUNT:
DATE =
AMOUNT =           $0.00
ENTER NEW ACCOUNT TITLE? CHECKING
NEXT DATE? 1/1/84
NEXT AMOUNT? 1000.00
ENTER 1-CONTINUE 2-MENU 9-EXIT? 2

```

Two trills indicate that the new entries are saved to the data file named ACCTS.DO. The line displayed at the bottom of the screen prompts you to 1-CONTINUE with more entries to this account, 2-return to the BANKER.BA MENU, or 9-EXIT to the main menu of the Model 100.

We now select option 2 to return to the BANKER menu and update account #2. Notice that the name assigned to account #1 appears on the screen now:

```

RUNNING BALANCE FOR THREE ACCOUNTS
1-UPDATE ACCOUNT #1-CHECKING
2-UPDATE ACCOUNT #2-
3-UPDATE ACCOUNT #3-
4-DISPLAY SUMMARY TABLE
9-EXIT
ENTER SELECTION NUMBER? 2

```



```

UPDATE ACCOUNT # 2 -
CURRENT ACCOUNT BALANCE =          $0.00
LAST ENTRY FOR THIS ACCOUNT:
DATE =
AMOUNT =          $0.00
ENTER NEW ACCOUNT TITLE? SAVINGS
NEXT DATE? 1/1/84
NEXT AMOUNT? 2500.00
ENTER 1-CONTINUE 2-MENU 9-EXIT? 2

```

Entries for a third account can be made in the same way. Finally, you can view a summary table for all three accounts by selecting option 4 from the BANKER menu.

```

ACCOUNT SUMMARY
ACCOUNT      DATE      BALANCE
CHECKING     1/1/84      1000
SAVINGS      1/1/84      2500
MONEY MARKET 1/1/84      2500

TOTAL =          $6,000.00
PRESS ANY KEY TO CONTINUE?

```

This program is one of the longest in this book. Over 1K of memory is required for the program and for the ACCTS.DO data file, where the account balances are stored.

Program Listing

Because this program is so long, you might want to type it directly as text in a file called BANKER.DO. Test it by loading it into BASIC, just the way you tested the programs from ACTIVE.DO. Make additional changes in the text file and retest if necessary. When the program runs the way you want it to, save it as BANKER.BA and kill BANKER.DO.

```

10 REM BANKER.BA
11 DEFSNG A-Z:GOSUB 1000
21 CLS:PRINT"RUNNING BALANCES FOR THREE ACCOUNTS
31 PRINT" 1-UPDATE ACCOUNT #1-" ;N$(1)
41 PRINT" 2-UPDATE ACCOUNT #2-" ;N$(2)
51 PRINT" 3-UPDATE ACCOUNT #3-" ;N$(3)
61 PRINT" 4-DISPLAY SUMMARY TABLE
71 PRINT" 9-EXIT
81 INPUT"ENTER SELECTION NUMBER";A:ON A GOTO 100,100,100,400,,,,,999
100 N=A:GOSUB 500
400 CLS:PRINT"ACCOUNT SUMMARY
420 PRINT"ACCOUNT      DATE      BALANCE

```

```

440 FOR I=1 TO 3:PRINT@(I+1)*40,N$(I):PRINT@(I+1)*40+15,DT$(I)
445 PRINT@(I+1)*40+30,T(I):NEXT:PRINT
450 PRINT USING"                TOTAL = $$$$$$$$$$,,##";T(1)+T(2)+T(3)
460 PRINT"PRESS ANY KEY TO CONTINUE";
465 A$=INKEY$:IF A$=""THEN 465 ELSE 10
500 CLS:PRINT"UPDATE ACCOUNT #"N$-"N$(N)
510 PRINT USING"CURRENT ACCOUNT BALANCE = $$$$$$$$,,##";T(N)
520 PRINT"LAST ENTRY FOR THIS ACCOUNT:"
530 PRINT "DATE = ";DT$(N)
540 PRINT USING"AMOUNT = $$$$$$$$$$,,##";A(N)
550 INPUT" ENTER NEW ACCOUNT TITLE";N$:IF N$="" THEN 560 ELSE N$(N)=N$
560 INPUT"NEXT DATE";DT$(N)
570 INPUT"NEXT AMOUNT";A(N)
580 T(N)=T(N)+A(N):GOSUB 2000:GOSUB 1000
590 INPUT"ENTER 1-CONTINUE 2-MENU 9-EXIT";A
600 ON A GOTO 500,10,999
999 MENU
1000 REM READ DATA FILE
1010 OPEN "RAM:ACCTS.DO"FOR INPUT AS 1
1015 ON ERROR GOTO 21
1018 IF EOF(1) THEN CLOSE:RETURN
1020 FOR I=1 TO 3:INPUT #1,N$(I),DT$(I),A(I),T(I)
1025 SOUND 4000,1:NEXT:CLOSE:RETURN
2000 REM SAVE DATA
2010 KILL"RAM:ACCTS.DO"
2020 OPEN"RAM:ACCTS.DO"FOR APPEND AS 1
2040 FOR I=1 TO 3:SOUND 3000,1
2050 PRINT #1,N$(I),"",DT$(I),"",A(I),"",T(I):NEXT:CLOSE:RETURN

```

The Money Growth Menu Program

If you have uses for all the programs in this chapter, you might find it handy to call them up by means of a menu. A program to produce such a menu is included here for your convenience. Future chapters will conclude with similar menus for their contents.

Sample Run

```

MONEY GROWTH QUESTIONS:
1-FUTURE VALUE OF AN AMOUNT
2-PRESENT VALUE OF AN AMOUNT
3-FUTURE VALUE OF A SERIES
4-PRESENT VALUE OF A SERIES
5-PAYMENT RQR'D TO MEET GOAL
6-INTEREST RATE OF LOAN
TYPE A NO, AND PRESS ENTER (9-EXIT)?

```

Program Listing

You can type everything shown in the following listing. This will enable the menu program to handle all of the other programs in this chapter. Alternatively, you can omit the appropriate lines if you didn't code all the programs called. Omit lines 30 and 100 if you omitted FUTURE.BA, 40 and 200 to omit PRESNT, 50 and 300 to omit FUTURS, 60 and 400 to omit PRESNS, 70 and 500 to omit SINKS, or 80 and 600 to omit INTRST.

Notice that the BANKER program has been omitted from the menu. You can include it if you want.

```
10 REM GROWME.BA
20 CLS:PRINT"MONEY GROWTH QUESTONS:"
30 PRINT" 1-FUTURE VALUE OF AN AMOUNT"
40 PRINT" 2-PRESENT VALUE OF AN AMOUNT"
50 PRINT" 3-FUTURE VALUE OF A SERIES"
60 PRINT" 4-PRESENT VALUE OF A SERIES"
70 PRINT" 5-PAYMENT RQR'D TO MEET GOAL"
80 PRINT" 6-INTEREST RATE OF LOAN"
90 INPUT"TYPE A NO. AND PRESS ENTER (9-EXIT)";A
95 ON A GOTO 100,200,300,400,500,600,999,999,999
100 LOAD"FUTURE.BA",R
200 LOAD"PRESNT.BA",R
300 LOAD"FUTURS.BA",R
400 LOAD"PRESNS.BA",R
500 LOAD"SINKS.BA",R
600 LOAD"INTRST.BA",R
999 MENU
```

If you wish, you can adapt this menu program to produce menus for other groups of programs that you write.

4

Real Estate

Real Estate Analysis Programs

- Determine monthly mortgage payments
- Determine the balance remaining on a loan
- Determine affordable purchase price based on fixed income
- Determine net cash flow on rental property
- Pie chart of property expenses
- Rent/purchase equivalent

What will the monthly payments be on a mortgage of \$80,000? What will be the balance remaining on the loan after five years? How much would be required to pay off the loan in ten years? What would be the effects of accelerating payments after three years?

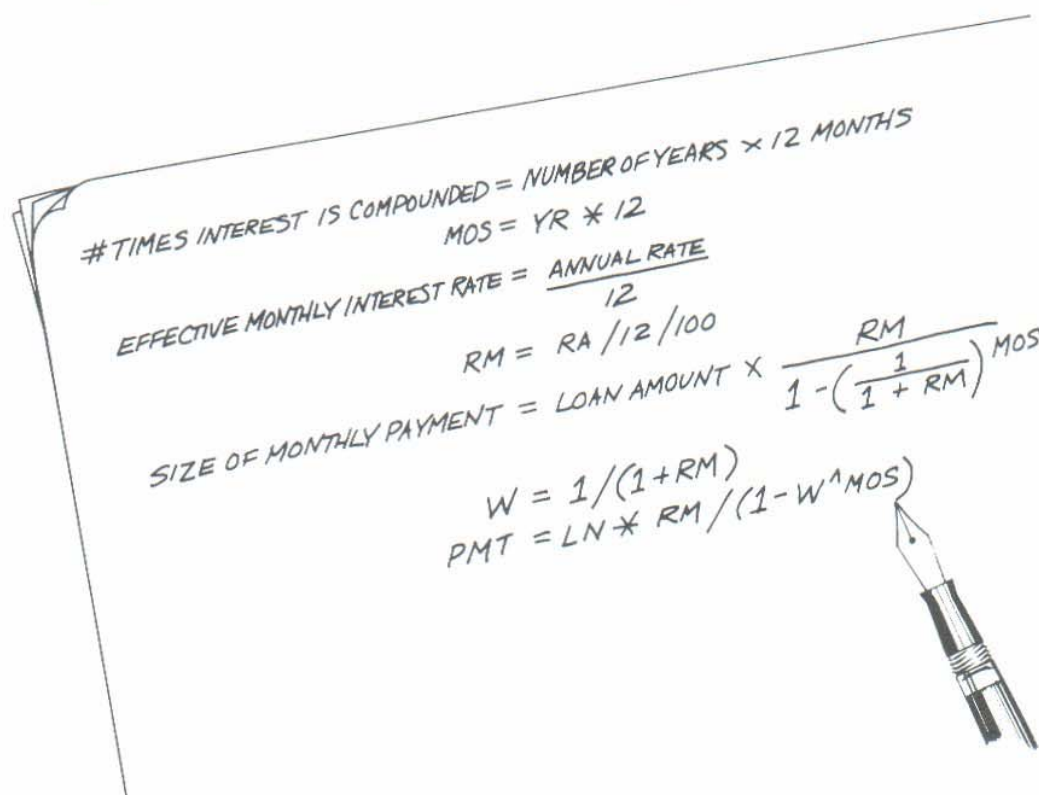
These are the kinds of questions that arise for anyone who has purchased, or is thinking about purchasing, real estate. Because these calculations can be quite cumbersome, buyers often trust the real estate agent to provide the answers. Armed with your Model 100 and the programs described in this chapter, however, you can answer these questions quickly and easily for yourself. Conversely, if you yourself are a real estate agent or a loan officer, the programs can help you serve your clients better. This chapter's five programs answer the most common real estate questions by determining monthly mortgage payments, the balance remaining on a loan, affordable purchase price based on fixed income, net cash flow on rental property, and effect of accelerated payments.

Determine Monthly Mortgage Payments

The first thing most buyers of a home or other real property want to know is what their monthly payments will be on a particular loan. Whether

you are a buyer, a seller, or an agent, this program will help you answer that question once the terms of the loan are known.

Given the loan amount, the interest rate, and the term of the loan, the monthly payments can be calculated according to the following formula:



Handwritten formulas on a notepad:

$$\begin{aligned} \# \text{TIMES INTEREST IS COMPOUNDED} &= \text{NUMBER OF YEARS} \times 12 \text{ MONTHS} \\ \text{MOS} &= \text{YR} \times 12 \\ \text{EFFECTIVE MONTHLY INTEREST RATE} &= \frac{\text{ANNUAL RATE}}{12} \\ \text{RM} &= \text{RA} / 12 / 100 \\ \text{SIZE OF MONTHLY PAYMENT} &= \text{LOAN AMOUNT} \times \frac{\text{RM}}{1 - \left(\frac{1}{1 + \text{RM}}\right)^{\text{MOS}}} \\ W &= 1 / (1 + \text{RM}) \\ \text{PMT} &= \text{LN} \times \text{RM} / (1 - W^{\text{MOS}}) \end{aligned}$$

Notice that this formula — and our program — will work for any kind of loan. You could apply it to an automobile purchase loan, a capital improvements loan, or anything similar, just as easily as to a real estate loan. Other programs in this chapter can also be adapted to different kinds of loans.

Sample Run

The mortgage payment program, PYMNTS.BA, prompts the user for three values: loan amount, annual interest rate, and loan period. Based on these entries, the program calculates and displays the monthly payment amount.

DETERMINE MONTHLY LOAN PAYMENTS:

AMOUNT BORROWED ? 90000
ANNUAL INTEREST RATE? 14
LOAN PERIOD (YRS) ? 30

MONTHLY PAYMENTS WILL BE: \$1,066.38
ENTER 1-REPLAY OR 9-RETURN TO MENU?

Program Listing

```
100 REM PYMNTS.BA
110 CLS:PRINT"DETERMINE MONTHLY LOAN PAYMENTS:"
120 PRINT
130 INPUT"AMOUNT BORROWED";LN
140 INPUT"ANNUAL INTEREST RATE";RA
150 INPUT"LOAN PERIOD (YRS)";YR
160 GOSUB 1000:PRINT
170 PRINT USING"MONTHLY PAYMENTS WILL BE:  $#####.##";PMT
180 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
190 ON A GOTO 100,,,,,,,999
999 MENU
1000 MOS=12*YR:RM=RA/100/12:W=1/(1+RM)
1010 PMT=LN*RM/(1-W^MOS):RETURN
```

After you type in these lines, give the program a test run by pressing **F4**. If any errors are listed, edit the appropriate lines and run the program again. Remember that you can press **SHIFT** **BREAK** at any time to exit the program while it is running. When the program runs as expected, save it under the filename PYMNTS.BA.

As you can see (lines 130-150), the program prompts for the three entries and assigns them to the following variables:

LN (amount of loan)

RA (annual rate of interest)

YR (term of loan in years)

Next, the program jumps to a subroutine (lines 1000 and 1010) and calculates these values:

MOS (term of loan in months)

RM (monthly rate of interest)

W ($1/(1+RM)$ — working value)

PMT (monthly loan payment amount)

Finally (line 170), the program displays the calculated monthly payment. All the programs in this chapter use the same variable names. Only the nature of the calculation, and thus the calculating formula, changes in each case.

In the previous listing, the program ends by returning to the main menu. At the end of this chapter, however, you will be shown how to write a "real estate menu" program (REALM.BA). If you want to run this monthly payment program from the real estate menu, you can change line 999 to:

```
999 LOAD "REALM.BA",R
```

If, on the other hand, you simply want the program to start over after each use, you could change line 999 to:

```
999 GOTO 100
```

In this case, you will have to press **SHIFT** **BREAK** when you want to exit the program. Then press **F8** to return to the main menu.

Determine the Balance Remaining on a Loan

Another commonly asked real estate question relates to the balance that will remain on a loan after a certain number of monthly payments have been made. The next program, BALNCE.BA, answers this question.

Sample Run

The program clears the screen and prompts the user for four entries: the loan amount, the annual interest rate, the loan period, and the payment number after which the balance is wanted.

```
DETERMINE BALANCE ON LOAN:
AMOUNT BORROWED      ? 90000
ANNUAL INTEREST RATE? 14
LOAN PERIOD (YRS)    ? 30
PAYMENT NUMBER       ? 24
MONTHLY PAYMENTS WILL BE:      $1,066.38
REMAINING BALANCE:           $89,549.21
ENTER 1-REPLAY OR 9-RETURN TO MENU?
```

In other words, if the buyer of a home purchased with a \$90,000 loan decides to sell after two years, he or she will have to sell the property for \$89,549 in order to cover the loan.

This same program can be used to answer a slightly different question: What is the size of the *balloon payment* that would be required on a loan after, say, five years? This question applies to loans where the monthly payments are calculated based on a term of, for example, 30 years, but the lending party requires a balloon payment to close out the loan at the end of only five years (or some other agreed-upon cutoff date). This type of arrangement is often made to allow the borrower to make relatively low monthly payments and renegotiate the terms of the loan after a few years. The borrower hopes that interest rates will have declined by the time of refinancing, whereas the lender, of course, hopes for higher rates.

For example, the current mortgage terms on our \$90,000 house loan are 30 years at 14%. If the interest rate falls to, let's say, 12% five years hence, the house's buyer could borrow \$88,587 (the balance remaining after five years) at 12% and pay off the original mortgage at that time. If this second loan also has a term of 30 years, the buyer's monthly payments would fall to \$911.22. You could find this by running the PYMNTS.BA program on the new figures. (Of course, interest rates may well have gone up, in which case the buyer will be worse off than before.)

Similarly, this program could be used to calculate the amount required to pay off a loan that is "due on sale". (These types of loans are generally not favorable to the borrower, since they are not assumable by the next purchasing party.)

Program Listing

Since BALNCE.BA is very similar to PYMNTS.BA, you can save keystrokes by modifying that program rather than typing the new one in from scratch. Just enter BASIC from the main menu and press (F2). In response to the LOAD prompt, type:

```
Load"PYMNTS
```

Next, create a text file by pressing (F3) and typing:

```
Save"ACTIVE.DO
```

If you now press (F8) to return to the main menu, both PYMNTS.BA and ACTIVE.DO should appear there as filenames. If you position your cursor over ACTIVE.DO and press (ENTER), you can edit the text of the program to make it calculate the balance on a loan.

In the listing below, line numbers that end in zero mark lines that are the same as lines in the PYMNTS.BA program. Lines ending in 1 have been edited or added in the ACTIVE.DO file. Line 120 of PYMNTS.BA has been deleted. The only new variable is loan balance (BAL), which is calculated in line 2000.

```

101 REM BALNCE,BA
111 CLS:PRINT"DETERMINE BALANCE ON LOAN:"
130 INPUT"AMOUNT BORROWED";LN
140 INPUT"ANNUAL INTEREST RATE";RA
150 INPUT"LOAN PERIOD (YRS)";YR
151 INPUT"PAYMENT NUMBER";MN
161 GOSUB 1000:GOSUB 2001
170 PRINT USING"MONTHLY PAYMENTS WILL BE:  $#####,,##";PMT
171 PRINT USING"REMAINING BALANCE:  $#####,,##";BAL
180 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
191 ON A GOTO 111,,,,,,,999
999 MENU
1000 MOS=12*YR:RM=RA/100/12:W=1/(1+RM)
1010 PMT=LN*RM/(1-W^MOS):RETURN
2001 BAL=LN:FOR I=1 TO MN:BAL=BAL-PMT+BAL*RM:NEXT:RETURN

```

Determine Affordable Purchase Price Based on Fixed Income

Potential buyers want to know all sorts of things about a piece of property, but the "bottom line" question is sure to be, "Given my income and the purchase price, can I afford to buy?" This next program can answer that question.

Sample Run

Our AFFORD.BA program begins by clearing the screen and asking six questions:

```

WHAT PURCHASE PRICE MATCHES INCOME?
BUYER'S NET INCOME/YR? 40000
ANNUAL INTEREST RATE? 14
LOAN PERIOD (YRS)? 30
ANNUAL EXPENSES, TAX, INS? 2000
%-INCOME FOR PAYMENTS? 40
% DOWN PAYMENT? 20
AMOUNT TO BE FINANCED: $98,463.54
AFFORDABLE PURCHASE PRICE: $123,079.42
ENTER 1-REPLAY OR 9-RETURN TO MENU?

```


Based on a current income of \$40,000 a year, assuming annual property expenses of \$2,000 (including taxes and insurance), and allowing 40% of monthly income for loan payments, our hypothetical buyer can afford to finance a \$98,463 loan and purchase a house costing about \$123,000.

Program Listing

Remember that the text file called ACTIVE.DO now contains the same lines as the BALNCE.BA program file. Edit ACTIVE.DO to create the program listed here, then save the new program under the name AFFORD.BA. Lines ending in 0 or 1 are the same as lines in BALNCE.BA; lines ending in 2, 3 or 4 have been changed or added here.

```

102 REM AFFORD.BA
112 CLS:PRINT"WHAT PURCHASE PRICE MATCHES INCOME?"
132 INPUT"BUYER'S NET INCOME/YR";NI
140 INPUT"ANNUAL INTEREST RATE";RA
150 INPUT"LOAN PERIOD (YRS)";YR
152 INPUT"ANNUAL EXPENSES,TAX,INS";EX
153 INPUT"%-INCOME FOR PAYMENTS";P1
154 INPUT"% DOWN PAYMENT";P2
162 GOSUB 1000:GOSUB 4002
172 PRINT USING"AMOUNT TO BE FINANCED:  $$$$$$,##";LN
173 PRINT USING"AFFORDABLE PURCHASE PRICE:  $$$$$$,##";PV
180 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
192 ON A GOTO 112,,,,,,999
999 MENU
1000 MOS=12*YR:RM=RA/100/12:W=1/(1+RM)
1012 PMT=P1/100*NI/12-EX/12:RETURN
4002 LN=(PMT*(1-W^MOS))/RM:PV=LN/(1-P2/100):RETURN

```

This program introduces several variables that do not appear in other programs in this chapter: buyer's annual income (NI); estimated annual expenses for maintaining the property, including taxes and insurance (EX); the percentage of annual income that the buyer is willing to pay monthly on the loan (P1); and the down payment as a percent of purchase price (P2). Based on these values plus interest rate and loan period, it calculates the loan amount that matches the monthly payments and also calculates the target purchase price.

Determine Net Cash Flow on Rental Property

Purchasing property and then renting it out is a popular form of investment for many businesspeople. Naturally, the investor wants the rental to

make a profit or at least cover costs while he or she waits for the property to appreciate enough to bring a profitable selling price. What monthly rental will achieve this goal for a given piece of property? This next program can help you find out.

Sample Run

Suppose you have a one-bedroom cottage on the rear of the property on which you live, and you decide to rent the cottage out for \$300 — a cheap price for your area, but the place needs some fixing up. You figure that the cottage and its land, if valued separately, would account for about \$20,000 of your house loan. Would the \$300 monthly rental make you a profit?

```
DETERMINE NET INCOME FROM RENTAL UNITS
AMOUNT BORROWED? 20000
ANNUAL INTEREST RATE? 14
LOAN PERIOD (YRS)? 30
ANNUAL EXPENSES, TAX, INS? 1200
MONTHLY RENTAL INCOME? 300
MONTHLY PAYMENT IS:           $236.97
ADDED MONTHLY EXPENSES:       $100.00
MONTHLY NET CASH FLOW:        -$36.97
ENTER 1-REPLAY OR 9-RETURN TO MENU?
```

If you rent the cottage out for \$300 a month, you will have to pay a small amount each month out of your own pocket to cover mortgage payments and other expenses. Not a very good investment! You see that you'll need to charge at least \$350 on your "funky" little cottage (better start thinking of it in positive terms) to do any more than break even.

Let's say it occurs to you that you could either do some renovating *before* renting the cottage out, or you could rent the cottage to a student carpenter who would donate labor and materials to improve the property while he lived there, paying only \$225 a month in rent. You try the program again, based on lower monthly expenses *and* lower rent.

```
DETERMINE NET INCOME FROM RENTAL UNITS
AMOUNT BORROWED? 20000
ANNUAL INTEREST RATE? 14
LOAN PERIOD (YRS)? 30
ANNUAL EXPENSES, TAX, INS? 600
MONTHLY RENTAL INCOME? 225
MONTHLY PAYMENT IS:           $236.97
ADDED MONTHLY EXPENSES:       $50.00
MONTHLY NET CASH FLOW:        -$61.97
ENTER 1-REPLAY OR 9-RETURN TO MENU?
```


Oops! Now you're stuck for almost \$62 a month. You'll have to weigh this factor against appreciation to the property from the carpenter/renter's work.

Program Listing

Most lines in this new program were adapted from the AFFORD.BA lines. Lines ending in 0, 1, 2, 3, or 4 are the same as lines in AFFORD.BA; lines ending in 5 or 6 must be changed or added here. Notice that lines 130, 170, and 1010 from PYMNTS.BA and BALNCE.BA have reappeared and must be typed in again.

```
105 REM RENTAL.BA
115 CLS:PRINT"DETERMINE NET INCOME FROM RENTAL UNITS
130 INPUT"AMOUNT BORROWED";LN
140 INPUT"ANNUAL INTEREST RATE";RA
150 INPUT"LOAN PERIOD (YRS)";YR
152 INPUT"ANNUAL EXPENSES,TAX,INS";EX
155 INPUT"MONTHLY RENTAL INCOME";RT
165 GOSUB 1000:GOSUB 5005
170 PRINT USING"MONTHLY PAYMENT IS:  $$$$$$,##";PMT
175 PRINT USING"ADDED MONTHLY EXPENSES:  $$$$$$,##";EX/12
176 PRINT USING"MONTHLY NET CASH FLOW:  $$$$$$,##";CF
180 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
195 ON A GOTO 115,,,,,,999
999 MENU
1000 MOS=12*YR:RM=RA/100/12:W=1/(1+RM)
1010 PMT=LN*RM/(1-W*MOS):RETURN
5005 CF=RT-PMT-EX/12:RETURN
```

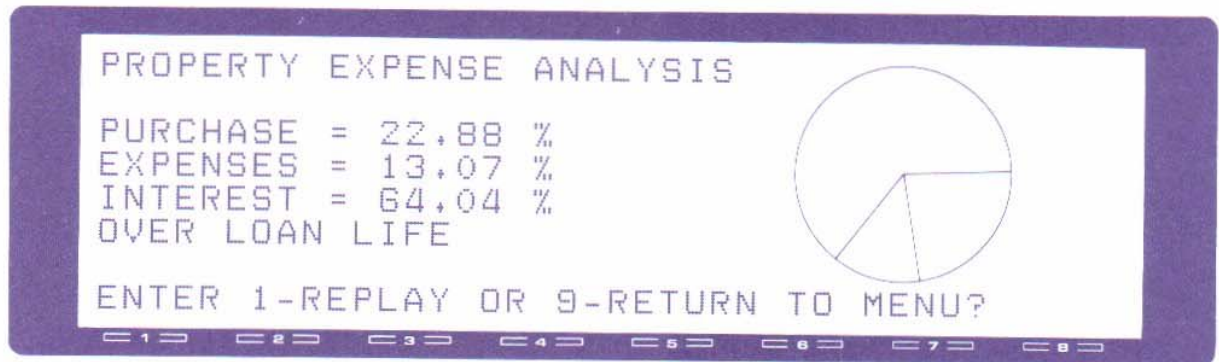
Pie Chart of Property Expenses

You can mix lines from the programs in this chapter with lines from the PIE.BA program in Chapter 2 to produce the following program, which draws a pie chart of expense categories over the life of a loan.

Sample Run

```
PIE CHART FOR PROPERTY EXPENSES
DOWN PAYMENT? 15000
AMOUNT BORROWED? 90000
ANNUAL INTEREST RATE? 14
LOAN PERIOD (YRS)? 30
ANNUAL EXPENSES,TAX,INS? 2000
```


After accepting these five inputs, the screen clears and the property expense over the life of the loan is broken down in percentages between purchase price, expenses (including tax and insurance), and interest on the loan.



Be warned that the pie chart created by this program cannot be printed by most printers.

Program Listing

The lines shown below were adapted from the RENTAL.BA lines. Lines ending in 0, 1, 2, 3, 4, 5, or 6 are the same as the matching lines in RENTAL.BA; lines ending in 7 must be changed or added here. The formulas for drawing a pie chart are similar to those used in the Pie Chart program created in Chapter 2.

```

107 REM PROPIE.BA
117 CLEAR:CLS:PRINT"PIE CHART FOR PROPERTY EXPENSES
127 INPUT"DOWN PAYMENT";DN
130 INPUT"AMOUNT BORROWED";LN
140 INPUT"ANNUAL INTEREST RATE";RA
150 INPUT"LOAN PERIOD (YRS)";YR
152 INPUT"ANNUAL EXPENSES,TAX,INS";EX
167 GOSUB 1000:GOSUB 7007
207 CLS:PRINT"PROPERTY EXPENSE ANALYSIS
217 R=25:M!=0:SD(0)=LN+IN+EX*YR+DN
227 PRINT:SD(1)=DN+LN:PRINTUSING"PURCHASE = ##.## %";100*SD(1)/SD(0)
237 SD(2)=EX*YR:PRINTUSING"EXPENSES = ##.## %";100*SD(2)/SD(0)
247 SD(3)=IN:PRINTUSING"INTEREST = ##.## %";100*SD(3)/SD(0)
257 PRINT"OVER LOAN LIFE
267 PRINT:GOSUB 8007
287 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
297 ON A GOTO 117,,,,,,,999
999 MENU
1000 MOS=12*YR:RM=RA/100/12:W=1/(1+RM)

```

```

1010 PMT=LN*RM/(1-W^MOS):RETURN
7007 FV=PMT*MOS:IN=FV-LN:RETURN
8007 A=3.14159/180:X=R*COS(A)+190:Y=R*SIN(A)+30:LINE(190,30)-(X,Y)
8017 FOR I=1 TO 3:M!=M!+CSNG(SD(I)/SD(0))
8027 FOR D=D TO INT(360*M!) STEP 3
8037 A=3.14159/180*D:X=R*COS(A)+190:Y=R*SIN(A)+30
8047 PSET(X,Y):SOUND(12000-D*10),1:NEXT D
8057 LINE(190,30)-(X,Y):NEXT I:RETURN

```

The Purchase Equivalent of Monthly Rent

Are you a renter who wishes you could become a homeowner instead? If so, you've no doubt wondered how expensive a house you could buy with a loan that had monthly payments equal to your current rent payments. A few simple changes to the PYMNTS.BA program will tell you. (Keep in mind, though, that as a house owner you'll have both additional expenses — repairs and so on — and additional savings in the form of tax deductions.)

Sample Run

The program BUYNOW.BA asks the user four questions. Then it calculates and displays two values:

```

PURCHASE EQUIVALENT OF RENT
MONTHLY PAYMENTS? 700
ANNUAL INTEREST RATE? 14
LOAN PERIOD (YRS)? 30
% DOWN REQUIRED? 15
LOAN EQUIVALENT =    $59,078.12
PRICE EQUIVALENT =    $69,503.68
ENTER 1-REPLAY OR 9-RETURN TO MENU?

```

The loan equivalent value is the amount of the loan someone could be financing at the terms specified (monthly payments, interest rate, loan life). The price equivalent is the purchase price of the property the person could afford at these terms, given the down payment percentage.

Program Listing

As mentioned, this program is adapted from PYMNTS.BA. Lines with numbers ending in zero are the same as those in PYMNTS.BA. Lines ending in 8 have been changed or added.


```

108 REM BUYNOW.BA
118 CLS:PRINT"PURCHASE EQUIVALENT OF RENT
138 INPUT"MONTHLY PAYMENTS";PMT
140 INPUT"ANNUAL INTEREST RATE";RA
150 INPUT"LOAN PERIOD (YRS)";YR
158 INPUT"% DOWN REQUIRED";P2:GOSUB 1000
168 PRINT USING"LOAN EQUIVALENT = $$$$$$,##";LN
178 PRINT USING"PRICE EQUIVALENT = $$$$$$,##";PV
180 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
198 ON A GOTO 118,,,,,,999
999 MENU
1000 MOS=12*YR:RM=RA/100/12:W=1/(1+RM)
1018 LN=PMT/(RM/(1-W^MOS)):PV=LN/(1-P2/100):RETURN

```

The Real Estate Menu Program

This last program ties all your real estate programs together — with only sixteen lines of code!

Sample Run

```

REAL ESTATE ANALYSIS OPTIONS
1-DETERMINE MONTHLY PAYMENTS
2-LOAN BALANCE AFTER N PAYMENTS
3-PURCHASE PRICE BASED ON INCOME
4-RENTAL UNIT NET CASH FLOW
5-PIE CHART OF PROPERTY EXPENSES
6-RENT/PURCHASE EQUIVALENT
TYPE A NUMBER & PRESS ENTER (9-EXIT)? 1

```

If you select option 1-DETERMINE MONTHLY PAYMENTS, you should see the screen clear, followed by prompts from the PYMNTS.BA program. Other choices work similarly.

Program Listing

This program is unlike any others in this chapter, so you might as well type it directly in BASIC.

```

10 REM REALM.BA
20 CLS:PRINT"REAL ESTATE ANALYSIS OPTIONS
30 PRINT"1-DETERMINE MONTHLY PAYMENTS
40 PRINT"2-LOAN BALANCE AFTER N PAYMENTS
50 PRINT"3-PURCHASE PRICE BASED ON INCOME
60 PRINT"4-RENTAL UNIT NET CASH FLOW

```



```

70 PRINT"5-PIE CHART OF PROPERTY EXPENSES
80 PRINT"6-RENT/PURCHASE EQUIVALENT
90 PRINT:INPUT"TYPE NUMBER & PRESS ENTER (9-EXIT)";A
99 ON A GOTO 100,200,300,400,500,600,,,999
100 LOAD"PYMNTS,BA",R
200 LOAD"BALNCE,BA",R
300 LOAD"AFFORD,BA",R
400 LOAD"RENTAL,BA",R
500 LOAD"PROPIE,BA",R
600 LOAD"BUYNOW,BA",R
999 MENU

```

Lines 30-80 of the program prompt for selection of the other programs. Once a selection is made, the program selected is loaded and run. If you would like to return to this real estate menu at the conclusion of each program in this chapter (rather than returning to the main Model 100 menu), change line 999 in all the other programs to:

```

999 LOAD"REALM,BA",R

```

Now that you've got these programs at your fingertips, we hope you're all ready to buy your dream home or make a killing in the real estate market (or both). Remember the old saying — "Real property never falls!"

5

Management Reports

Financial Report Data

Management Reports Menu Program

- Income/expense report update
- Balance sheet report update
- Display the income/expense report
- Display balance sheet summary
- Ratio analysis

Ratio Analysis Menu Program

- Profitability ratio analysis
- Liquidity ratio analysis
- Leverage analysis
- Activity analysis

What were your total revenues last quarter? Total expenses? What is your current net worth? How do your profitability ratios compare to those of others in your industry? How liquid are your assets? What are your debt/equity ratios? These are the kinds of questions loan agents and serious investors ask about companies that seek outside support. These are also questions you might ask about companies in which you are considering investing, and they are questions you will need to answer about your company if you are seeking outside investors.

Whatever your reason for concern with these questions, the programs in this chapter can help you answer them. If you operate any sort of small business or are interested in the finances of another company, these programs will be invaluable for you.

One program allows you to update actual or estimated income and expense, and another displays an income/expense report with subtotaled categories. A third program allows you to update assets and liabilities, while a fourth displays a balance sheet or net worth statement. Four additional programs calculate four types of ratios that can be compared to the ratios

of other companies in the industry. Finally, two menu programs tie the other eight programs together into an easily operated, coherent system of reports.

Financial Report Data

Each of the programs described in this chapter works with a basic set of financial data that is stored in a file called MDATA.DO. This file consists of twenty-seven entries, separated by commas. The update programs take care of generating this file for you.

Information Stored in the Management Data File: MDATA.DO

(with the variable names as used in these programs)

D1\$	Date of income/expense report
SB	Previous retained earnings (starting balance)
NS	Net sales (this period)
OI	Other income
GS	Cost of goods sold
OP	Operating expenses
DP	Depreciation
OE	Other expenses
TX	Taxes
DV	Dividends
CB	Cash balance
D2\$	Date of balance sheet
AR	Accounts receivable
BD	Bad debt allowance
IN	Value of inventory
PP	Pre-paid expenses
ME	Machinery and equipment
RE	Buildings
ES	Land
DA	Depreciation allowance
GW	Good will
AP	Accounts payable
ST	Short-term loans
TA	Accrued taxes
LT	Long-term loans
CS	Common stock

Based on the entries made for each of the variables in MDATA.DO, other values are calculated by the various programs in this Management Reports System. For example, the income/expense report program (INCEXP.BA) calculates gross profit from sales, gross operating profit, net operating income, gross income, net income before and after taxes, and net retained earnings. The balance sheet summary program (BSHEET.BA) calculates current assets, fixed assets, total assets, current liabilities, and total equity. All ratio calculations — profitability, liquidity, leverage, and activity ratios — are based on entries and calculations made in connection with the management reports programs.

If you decide to use all the programs in this chapter, you will need more than 5000 bytes (that is, more than you get with the Model 100's minimum 8K memory capacity). Therefore, you may not want to enter every program in this chapter. You can select the programs of most interest to you, based on the relationships shown in Figure 5-1.

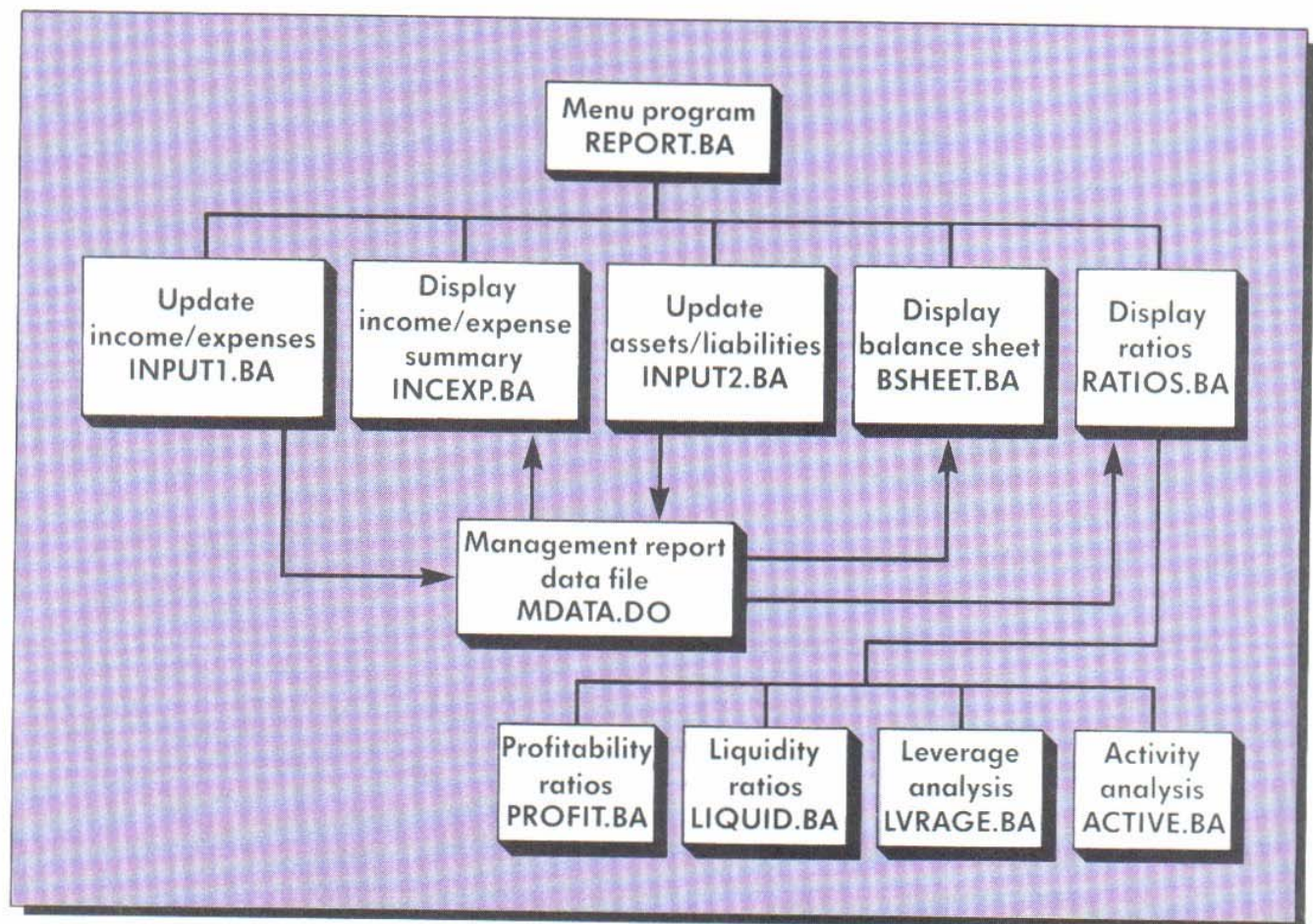


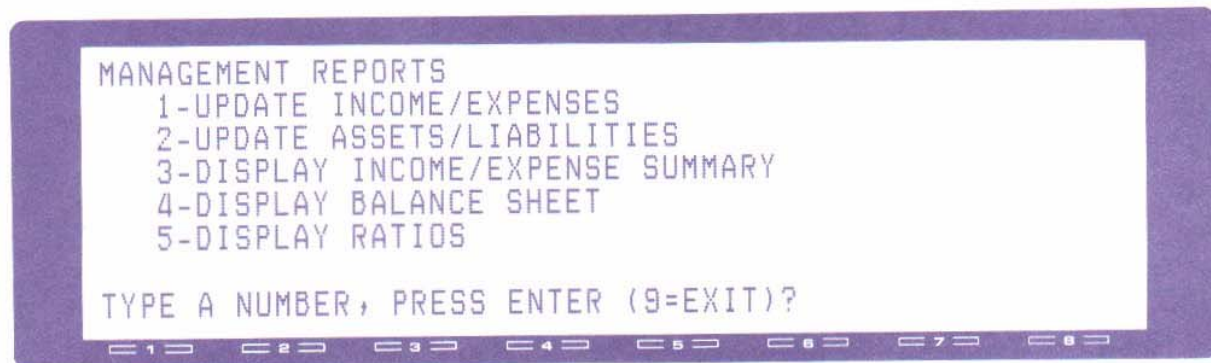
Figure 5-1. The complete management report system

Note that programs INPUT1 and INCEXP go together for income/expense entries and reporting. Programs INPUT2 and BSHEET go together for balance sheet reporting and are affected by the entries made through INPUT1. All of the ratio programs (LIQUID, PROFIT, ACTIVE, and LVRAGE) are based on entries made through INPUT1 and INPUT2.

Management Reports Menu Program

In building your Management Reports System, you might want to code your menu program first and save it under the name REPORT.BA. When it comes up on the screen, it should look like this:

Sample Run



```
MANAGEMENT REPORTS
  1-UPDATE INCOME/EXPENSES
  2-UPDATE ASSETS/LIABILITIES
  3-DISPLAY INCOME/EXPENSE SUMMARY
  4-DISPLAY BALANCE SHEET
  5-DISPLAY RATIOS

TYPE A NUMBER, PRESS ENTER (9=EXIT)?
```

Program Listing

This menu program is optional; you can run the other programs in the chapter without using it. Also, if you do not wish to use every program in the Management Reports System, you can adapt this menu program to suit your needs. For example, if you decide to omit ratio analysis from your system, omit lines 26 and 6000 in the program below.

```
10 REM REPORT.BA (454 bytes)
21 CLS:PRINT"MANAGEMENT REPORTS
22 PRINT"  1-UPDATE INCOME/EXPENSES
23 PRINT"  2-UPDATE ASSETS/LIABILITIES
24 PRINT"  3-DISPLAY INC/EXP SUMMARY
25 PRINT"  4-DISPLAY BALANCE SHEET
26 PRINT"  5-DISPLAY RATIOS
27 PRINT
28 INPUT"TYPE A NUMBER, PRESS ENTER (9=EXIT)";A
29 ON A GOTO 2000,3000,4000,5000,6000,,,999
```

```

999 MENU
2000 LOAD"INPUT1,BA",R
3000 LOAD"INPUT2,BA",R
4000 LOAD"INCEXP,BA",R
5000 LOAD"BSHEET,BA",R
6000 LOAD"RATIOS,BA",R

```

As you can see, the last five lines of this program cause the five other programs in the system to be loaded.

Income/Expense Report Update

As explained earlier, all the programs in our Management Reports System use a text file named MDATA.DO, where all the management data entries are stored. This file will be updated with new figures whenever INPUT1 or INPUT2 is run. The figures in this file are used as input in all the other programs of the Management Reports System. Use the TEXT program to create an empty MDATA.DO file before running the following programs. Once MDATA.DO is created, the INPUT1 program can be run to collect income/expense figures. This program works with figures of up to five digits.

Sample Run

Here is an income/expense report that might be prepared by a small business, for example, one run by a woman who makes boutique dolls at home.

INCOME/EXPENSE REPORT UPDATE

```

DATE OF REPORT? 31DEC83
NET SALES THIS PERIOD? 2500
COST OF GOODS SOLD? 1300
OPERATING EXPENSES? 300
DEPRECIATION? 200
OTHER INCOME? 0
OTHER EXPENSES? 0
TAXES? 100
DIVIDENDS? 0
STARTING BALANCE? 2500
PRESS ANY KEY TO CONTINUE?

```

When using this program, you *must* make all entries for all the categories, including the last: PRESS ANY KEY TO CONTINUE. Then the program will automatically update the MDATA.DO file with the new infor-

mation. Enter zero for categories that are not relevant. This program expects all entries but the first to be numeric. The message "Redo from start" will appear if you make a nonnumeric entry, and you can simply reenter the information for that item. You can preserve values that have already been entered and saved in MDATA.DO simply by pressing **ENTER** in response to any question.

At the end of these entries, the management reports menu appears on the screen, prompting you for your next selection.

Program Listing

This program simply collects and saves the information required for the income/expense report produced by a different program, INCEXP.BA, which will be described later in this chapter.

```

2000 REM INPUT1.BA
2010 GOSUB 7000
2011 CLS:PRINT"INCOME/EXPENSE REPORT UPDATE
2012 PRINT
2013 INPUT"  DATE OF REPORT";D1$
2032 INPUT"  NET SALES THIS PERIOD";NS
2042 INPUT"  COST OF GOODS SOLD";GS
2062 INPUT"  OPERATING EXPENSES";OP
2082 INPUT"  DEPRECIATION";DP
2102 INPUT"  OTHER INCOME";OI
2122 INPUT"  OTHER EXPENSES";OE
2142 INPUT"  TAXES";TX
2162 INPUT"  DIVIDENDS";DV
2182 INPUT"  STARTING BALANCE";SB
2202 PRINT"PRESS ANY KEY TO CONTINUE"
2204 A$=INKEY$:IF A$=""THEN 2204 ELSE GOTO 9000
7000 OPEN"RAM:MDATA.DO"FOR INPUT AS 1:ON ERROR GOTO 2011
7010 INPUT #1,D1$,SB,NS,OI,GS,OP,DP,OE,TX,DV,CB,
D2$,AR,BD,IN,PP,ME,RE,ES,DA,GW,AP,ST,TA,LT,CS,XX
7099 RETURN
9000 CLOSE:OPEN"RAM:MDATA.DO"FOR OUTPUT AS 1
9010 PRINT #1,D1$,"SB","NS","OI","GS","OP","DP","OE","TX","DV","CB",
"D2$","AR","BD","IN","PP","ME","RE","ES","DA","GW","AP","ST","TA",
"LT","CS","XX":CLOSE 1
9999 LOAD"REPORT.BA",R

```

As you can see, the program begins with the GOSUB instruction to the subroutine in line 7000. Lines 7000-7099 collect the information currently stored in the MDATA.DO file. Next, lines 2013-2182 prompt for your new income and expense entries. Your answers here replace any values that were formerly entered for these variables. Finally, lines 9000-9010 update the

MDATA.DO file with the new information. If you will not be using the management reports menu program, change line 9999 to:

9999 MENU

Balance Sheet Report Update

While the income/expense entries record the activity level during a certain period (a year, a quarter, a month, or whatever), the assets/liabilities entries on a balance sheet record a state of being at a particular point in time. Both perspectives are needed in assessing a company's status.

Sample Run

Here's a balance sheet for our boutique doll business.

BALANCE SHEET REPORT UPDATE

DATE OF REPORT? 31DEC83
CASH ON HAND? 2500
ACCOUNTS RECEIVABLE? 1000
BAD DEBT ALLOWANCE? 350
VALUE OF INVENTORY? 2000
PREPAID EXPENSES? 150
MACHINERY & EQUIPMENT? 400
BUILDINGS? 0
LAND? 0
DEPRECIATION ALLOWANCE? 300
GOODWILL? 500
ACCOUNTS PAYABLE? 500
SHORT-TERM LOANS? 250
ACCRUED TAXES? 400
LONG-TERM LOANS? 0
COMMON STOCK? 0
PRESS ANY KEY TO CONTINUE?

As with INPUT1, you must answer all the prompts in this program, including the last: PRESS ANY KEY TO CONTINUE. Then the program automatically updates the MDATA.DO file with the new information. Like the last one, this program expects all entries to be numeric. You can preserve values that have already been entered and saved in MDATA.DO by pressing **(ENTER)** in response to any question. At the end of all entries, the management reports menu appears on the screen, prompting you for your next selection.

Program Listing

Notice that the seven lines at the end of this program are exactly the same as the seven lines at the end of INPUT1 (except for the last line number in line 7000). Instead of retyping them, you can load INPUT1 into BASIC, go into EDIT mode and mark lines 7000-9999 as a block by using (F7) and the arrow keys. Then press (F5) to copy the marked lines into the paste area. Finally, when typing the INPUT2 program, simply press (PASTE) after typing line 3262. (You will have to change the line number reference in line 7000 from 2011 to 3011.)

```
3000 REM INPUT2.BA
3010 GOSUB 7000
3011 CLS:PRINT"BALANCE SHEET REPORT UPDATE
3012 PRINT
3013 INPUT"  DATE OF REPORT";D2$
3042 INPUT"  CASH ON HAND  ";CB
3052 INPUT"  ACCOUNTS RECEIVABLE";AR
3062 INPUT"  BAD DEBT ALLOWANCE";BD
3072 INPUT"  VALUE OF INVENTORY";IN
3082 INPUT"  PREPAID EXPENSES";PP
3102 INPUT"  MACHINERY & EQUIPMENT";ME
3112 INPUT"  BUILDINGS";RE
3122 INPUT"  LAND";ES
3132 INPUT"  DEPRECIATION ALLOWANCE";DA
3152 INPUT"  GOODWILL";GW
3192 INPUT"  ACCOUNTS PAYABLE";AP
3202 INPUT"  SHORT-TERM LOANS";ST
3212 INPUT"  ACCRUED TAXES";TA
3232 INPUT"  LONG-TERM LOANS";LT
3252 INPUT"  COMMON STOCK";CS
3262 PRINT"PRESS ANY KEY TO CONTINUE"
3264 A$=INKEY$:IF A$=""THEN 3264 ELSE 9000
7000 OPEN"RAM:MDATA.DO"FOR INPUT AS 1:ON ERROR GOTO 3011
7010 INPUT #1,D1$,SB,NS,OI,GS,OP,DP,DE,TX,DV,CB,
D2$,AR,BD,IN,PP,ME,RE,ES,DA,GW,AP,ST,TA,LT,CS,XX
7099 RETURN
9000 CLOSE:OPEN"RAM:MDATA.DO"FOR OUTPUT AS 1
9010 PRINT #1,D1$,"SB","NS","OI","GS","OP","DP","DE","TX","DV","CB",
"D2$","AR","BD","IN","PP","ME","RE","ES","DA","GW","AP","ST","TA",
"LT","CS","XX:CLOSE 1
9999 LOAD"REPORT,BA",R
```

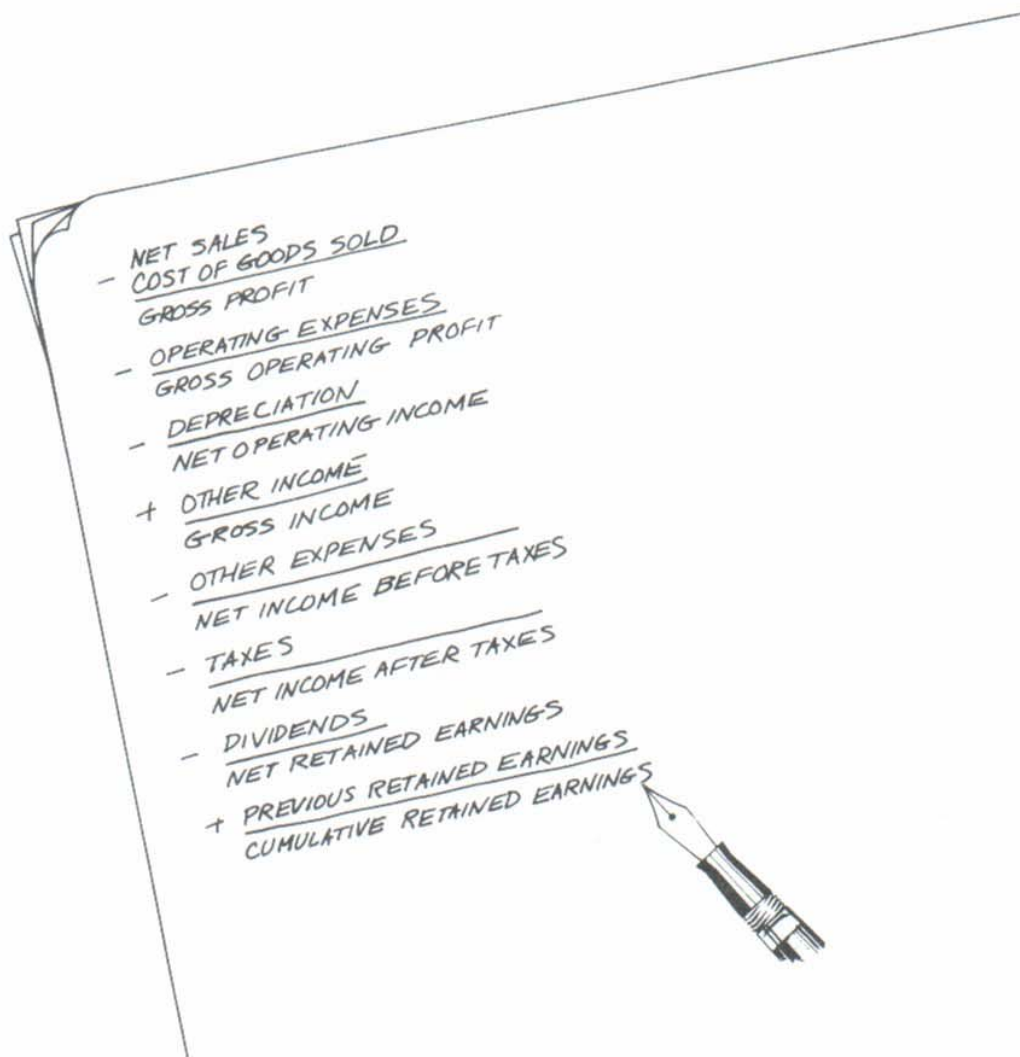
Like the previous program, this one begins with the GOSUB instruction to the subroutine in line 7000. Lines 7000-7099 collect the information currently stored in the MDATA.DO file. Then lines 3011-3262 prompt for your new balance sheet entries. Your answers replace any values that were

formerly entered for these variables. Finally, lines 9000-9010 update the MDATA.DO file with the new information. If you will not be using the management reports menu program, change line 9999 to:

9999 MENU

Display Income/Expense Report

Using the income/expense information in the MDATA.DO file (which was entered using the INPUT1.BA program), our next program, IN-CEXP.BA, calculates the values needed in an income/expense report using the following set of formulas:



It displays the information with subtotaled categories, as shown in the box on the next page (negative values from calculations will be displayed if appropriate).

Income/Expense Report Calculations

GP	Gross profit = net sales – cost of goods sold
GO	Gross operating profit = gross profit – operating expenses
NO	Net operating income = gross operating profit – depreciation
GI	Gross Income = net operating income – other income
NI	Net income before taxes = gross income – other expenses
NT	Net income after taxes = net income before taxes – taxes
E1	Net retained earnings = net income after taxes – dividends
E2	Current (cumulative) retained earnings = net retained earnings + previous retained earnings

This income/expense report requires three full screen displays. The program pauses after displaying each screen, offering you the chance to ponder the screen's contents or to print it out.

Sample Run

The values calculated by this program are shown in the following report format. To update any items of information shown in the report, use INPUT.BA to update MDATA.DO.

```
INCOME/EXPENSE REPORT AS OF 31DEC83

NET SALES THIS PERIOD      2500
LESS COST OF GOODS SOLD   1300
GROSS PROFIT (SALES)       =   $1,200
LESS OPERATING EXPENSES   300
PRESS ANY KEY TO CONTINUE?
```

If your Model 100 is hooked up to a printer, you can press **PRINT** as each screen of this report is displayed. Using this technique saves you from coding many extra program lines to print the report.

```
GROSS OPERATING PROFIT    =   $900
LESS DEPRECIATION         200
NET OPERATING PROFIT      =   $700
PLUS OTHER INCOME         0
GROSS INCOME              =   $700
LESS OTHER EXPENSES       0
NET INC BEFORE TAXES      =   $700
PRESS ANY KEY TO CONTINUE?
```

LESS TAXES	100	
NET INC AFTER TAXES	=	\$600
LESS DIVIDENDS	0	
NET RETAINED EARNINGS	=	\$600
PLUS PREVIOUS EARNINGS	2500	
CUM RETAINED EARNINGS	=	\$3,100

PRESS ANY KEY TO CONTINUE?

Again, this program returns you to the management reports menu when it is done.

Program Listing

Lines 7000-7010 of this program are exactly the same as those lines in the last two programs. Rather than retype them, you can PASTE them from INPUT1 or INPUT2.

Additional bytes of memory have been used to align the calculated values neatly on the screen display (or the printout). If you are more concerned about space than beauty, you can omit the extra spaces that precede "=\$\$#####" in the lines below.

```

4000 REM INCEXP,BA
4001 GOSUB 7000
4011 CLS:PRINT"INCOME/EXPENSE REPORT AS OF "D1$
4021 PRINT
4031 PRINT" NET SALES THIS PERIOD    ";NS
4041 PRINT"  LESS COST OF GOODS SOLD";GS
4043 PRINT USING" GROSS PROFIT (SALES)      =$$$$$$#, ";GP
4061 PRINT"  LESS OPERATING EXPENSES";OP
4064 GOSUB 8100
4073 CLS:PRINT USING" GROSS OPERATING PROFIT  =$$$$$$#, ";GO
4081 PRINT"  LESS DEPRECIATION          ";DP
4093 PRINT USING" NET OPERATING PROFIT        =$$$$$$#, ";NO
4101 PRINT"  PLUS OTHER INCOME          ";OI
4113 PRINT USING" GROSS INCOME              =$$$$$$#, ";GI
4121 PRINT"  LESS OTHER EXPENSES        ";DE
4133 PRINT USING" NET INC BEFORE TAXES       =$$$$$$#, ";NI
4134 GOSUB 8100
4141 CLS:PRINT"  LESS TAXES                ";TX
4153 PRINT USING" NET INC AFTER TAXES        =$$$$$$#, ";NT
4161 PRINT"  LESS DIVIDENDS              ";DV
4173 PRINT USING" NET RETAINED EARNINGS      =$$$$$$#, ";E1
4181 PRINT"  PLUS PREVIOUS EARNINGS ";SB
4193 PRINT USING" CUM RETAINED EARNINGS     =$$$$$$#, ";E2

```



```

4201 PRINT: GOSUB 8100
4299 LOAD"REPORT,BA",R
7000 OPEN"RAM:MDATA.DO"FOR INPUT AS 1
7010 INPUT #1,D1$,SB,NS,OI,GS,OP,DP,OE,TX,DV,CB,
D2$,AR,BD,IN,PP,ME,RE,ES,DA,GW,AP,ST,TA,LT,CS,XX:CLOSE
8000 GP=NS-GS:GO=GP-OP:NO=GO-DP:GI=NO+OI:NI=GI-OE
8010 NT=NI-TX:E1=NT-DV:E2=E1+SB
8100 PRINT "PRESS ANY KEY TO CONTINUE";
8102 A$=INKEY$:IF A$=""THEN 8102 ELSE RETURN
8999 RETURN

```

Again, the program begins with the GOSUB instruction to line 7000. Lines 7000-7010 collect the information currently stored in the MDATA.DO file. Next, lines 4011-4203 display the balance sheet summary on a series of three screens.

If you will not be using the management reports menu program, change line 4299 to:

```
4299 MENU
```

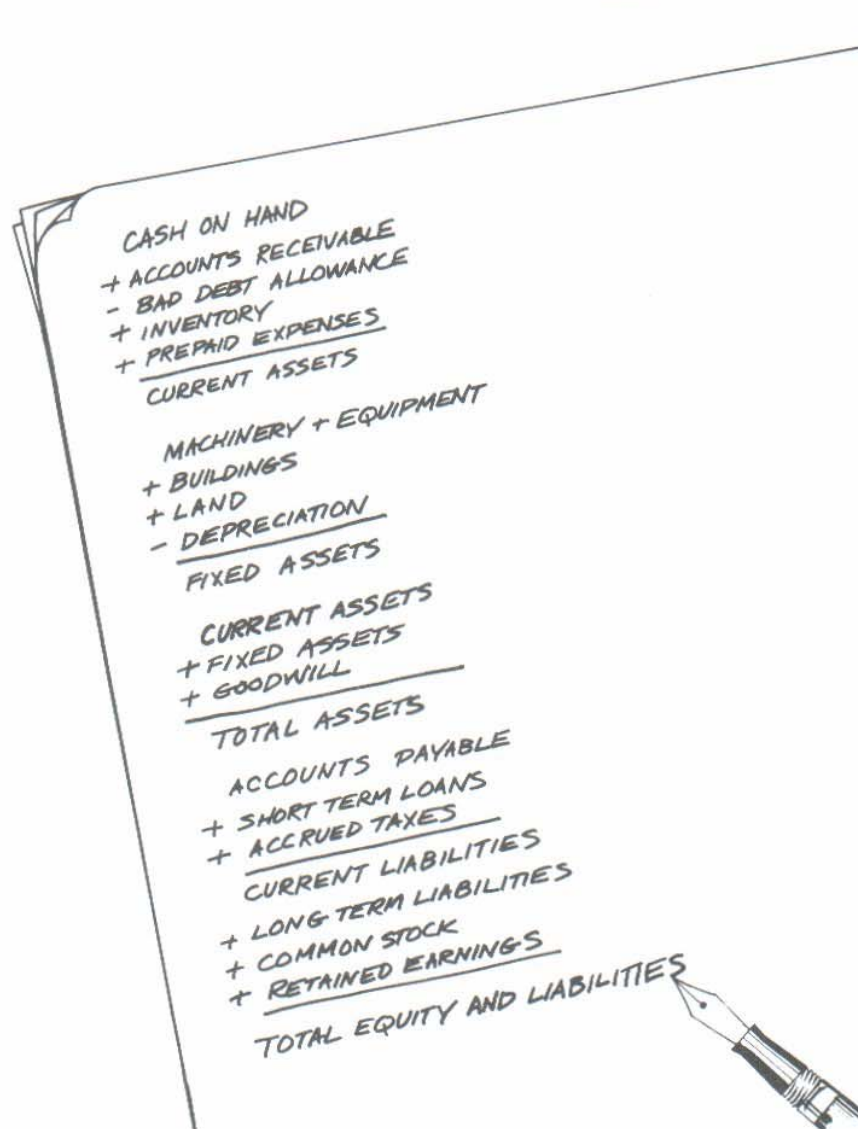
Display Balance Sheet Summary

You can use the BSHEET.BA program to display the information entered through INPUT2, with subtotaled categories, as shown below.

Balance Sheet Calculations

CA	Current assets = cash on hand + accounts receivable – bad debt allowance + inventory + prepaid expenses
OA	Fixed assets = machinery and equipment + buildings + land – depreciation allowance
AS	Total assets = current assets + fixed assets
CL	Current liabilities = accounts payable + short-term loans + accrued taxes
LT	Long-term liabilities
TE	Total equity and liabilities = current liabilities + long-term liabilities + common stock + retained earnings

This program calculates its values from the balance sheet information in the MDATA.DO file using these formulas:



Sample Run

The balance sheet summary requires five screens, as shown below. The program pauses after each screen, allowing time for contemplation or printing.

```

BALANCE SHEET SUMMARY AS OF 31DEC83

ASSETS:
CASH ON HAND                2500
PLUS ACCOUNTS REC'VABLE    1000
LESS BAD DEBT ALLOWANCE     350
PRESS ANY KEY TO CONTINUE?

1 2 3 4 5 6 7 8
  
```


PLUS VALUE OF INVENTORY	2000	
PLUS PREPAID EXPENSES	150	
CURRENT ASSETS	=	\$5,300
PLUS MACHINES/EQUIPMENT	400	
PLUS BUILDINGS	0	
PLUS LAND	0	
LESS DEPRECIATION ALLOWANCE	300	

PRESS ANY KEY TO CONTINUE?

1 2 3 4 5 6 7 8

FIXED ASSETS	=	\$100
PLUS GOODWILL	500	
TOTAL ASSETS	=	\$5,900

PRESS ANY KEY TO CONTINUE?

1 2 3 4 5 6 7 8

LIABILITIES:

ACCOUNTS PAYABLE	500	
PLUS SHORT-TERM LOANS	250	
PLUS ACCRUED TAXES	400	
CURRENT LIABILITIES	=	\$1,150
PLUS LONG-TERM LOANS	0	

PRESS ANY KEY TO CONTINUE?

1 2 3 4 5 6 7 8

TOTAL LIABILITIES	=	\$1,150
PLUS COMMON STOCK	0	
PLUS RETAINED EARNINGS	3100	
TOTAL EQUITY	=	\$4,250

PRESS ANY KEY TO CONTINUE?

1 2 3 4 5 6 7 8

Again, this program returns to the management reports menu on completion.

Program Listing

You can PASTE lines 7000-7010 from earlier programs in this series, as before. (Change the line reference in line 7000 to 5011.) You can also include the key press subroutine (lines 9000-9010). If you are interested in saving memory space and don't care whether the screen display or printout shows calculated subtotals in a neat column, you can omit the extra spaces that appear before all "=\$\$#####" entries in the lines below.

```
5000 REM BSHEET.BA
5001 DEFINT A-Z:GOSUB 7000
5011 CLS:PRINT"BALANCE SHEET SUMMARY AS OF "D2$
5021 PRINT
5031 PRINT"ASSETS:
5041 PRINT" CASH ON HAND";CB
5051 PRINT" PLUS ACCOUNTS REC'VABLE";AR
5061 PRINT" LESS BAD DEBT ALLOWANCE";BD
5064 GOSUB 9000
5071 CLS:PRINT" PLUS VALUE OF INVENTORY";IN
5081 PRINT" PLUS PREPAID EXPENSES ";PP
5093 PRINT USING" CURRENT ASSETS                =$$$$#####, ";CA
5101 PRINT" PLUS MACHINES/EQUIPMENT";ME
5111 PRINT" PLUS BUILDINGS                ";RE
5121 PRINT" PLUS LAND                      ";ES
5131 PRINT" LESS DEPRECIA'N ALLWNCE";DA
5134 GOSUB 9000
5144 CLS:PRINT
5151 PRINT USING" FIXED ASSETS                =$$$$#####, ";DA
5161 PRINT" PLUS GOODWILL                    ";GW
5163 PRINT USING" TOTAL ASSETS                =$$$$#####, ";AS
5171 PRINT
5174 GOSUB 9000
5181 CLS:PRINT"LIABILITIES:"
5191 PRINT" ACCOUNTS PAYABLE                ";AP
5201 PRINT" PLUS SHORT-TERM LOANS          ";ST
5211 PRINT" PLUS ACCRUED TAXES              ";TA
5223 PRINT USING" CURRENT LIABILITIES        =$$$$#####, ";CL
5231 PRINT" PLUS LONG-TERM LOANS           ";LT
5234 GOSUB 9000
5243 CLS:PRINT USING" TOTAL LIABILITIES        =$$$$#####, ";CL+LT
5251 PRINT" PLUS COMMON STOCK              ";CS
5261 PRINT" PLUS RETAINED EARNINGS          ";E2
5273 PRINT USING" TOTAL EQUITY                =$$$$#####, ";TE
5281 PRINT
```



```

5291 GOSUB 9000
5299 LOAD"REPORT.BA",R
7000 OPEN"RAM:MDATA.DO"FOR INPUT AS 1
7010 INPUT #1,D1$,SB,NS,OI,GS,OP,DP,OE,TX,DV,CB,
D2$,AR,BD,IN,PP,ME,RE,ES,DA,GW,AP,ST,TA,LT,CS,XX:CLOSE
8000 GP=NS-GS:GO=GP-OP:NO=GO-DP:GI=NO+OI:NI=GI-OE
8010 NT=NI-TX:E1=NT-DV:E2=E1+SB
8500 CA=CB+AR-BD+IN+PP:OA=ME+RE-DA+ES:AS=CA+OA+GW
8510 CL=AP+ST+TA:TE=CL+LT+CS+E2
8999 RETURN
9000 PRINT "PRESS ANY KEY TO CONTINUE";
9010 A$=INKEY$:IF A$=""THEN 9010 ELSE RETURN

```

As in other programs in this Management Reports System, the program begins with the GOSUB instruction to jump to line 7000. Lines 7000-7010 collect the information currently stored in the MDATA.DO file. Next, lines 8500-8999 calculate subtotals for current assets, fixed assets, total assets, current liabilities, long-term liabilities, and total equity. Lines 5011-5291 display the balance sheet summary on a series of four screens. If you will not be using the management reports menu program, change line 5299 to:

```
5299 MENU
```

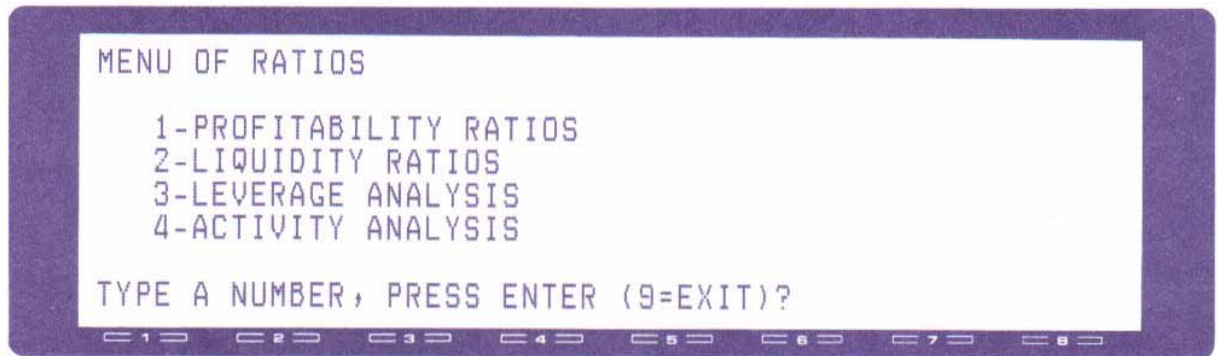
Ratio Analysis Menu Program

The ratio analysis option on the management reports menu actually runs five programs: a secondary menu and four ratio analysis programs. These programs require the MDATA.DO file; they therefore work in conjunction with INPUT1 and INPUT2.

The first program in this series, RATIOS.BA, is the program for the submenu that follows the management reports menu when you select the fifth option — to display ratios. The submenu asks you to choose among four types of ratio analysis.

Remember that any of these ratio programs, like the others in the chapter, can be run on its own, without going through a menu program. The menu programs are there only to make it easier to remember which program does what.

Sample Run



The selection of menu option determines which ratio program will be executed. In all cases, you are returned to the management reports menu after viewing the ratio figures.

Program Listing

```
6000 REM RATIOS.BA
6011 CLS:PRINT"MENU OF RATIOS
6012 PRINT
6013 PRINT"    1-PROFITABILITY RATIOS
6014 PRINT"    2-LIQUIDITY RATIOS
6015 PRINT"    3-LEVERAGE ANALYSIS
6016 PRINT"    4-ACTIVITY ANALYSIS
6017 PRINT
6018 INPUT"TYPE A NUMBER, PRESS ENTER (9=EXIT)";A
6019 ON A GOTO 6100,6200,6300,6400,6099,6099,6099,6099,6099
6099 LOAD"REPORT.BA",R
6100 LOAD"PROFIT.BA",R
6200 LOAD"LIQUID.BA",R
6300 LOAD"LVRAGE.BA",R
6400 LOAD"ACTIVE.BA",R
```

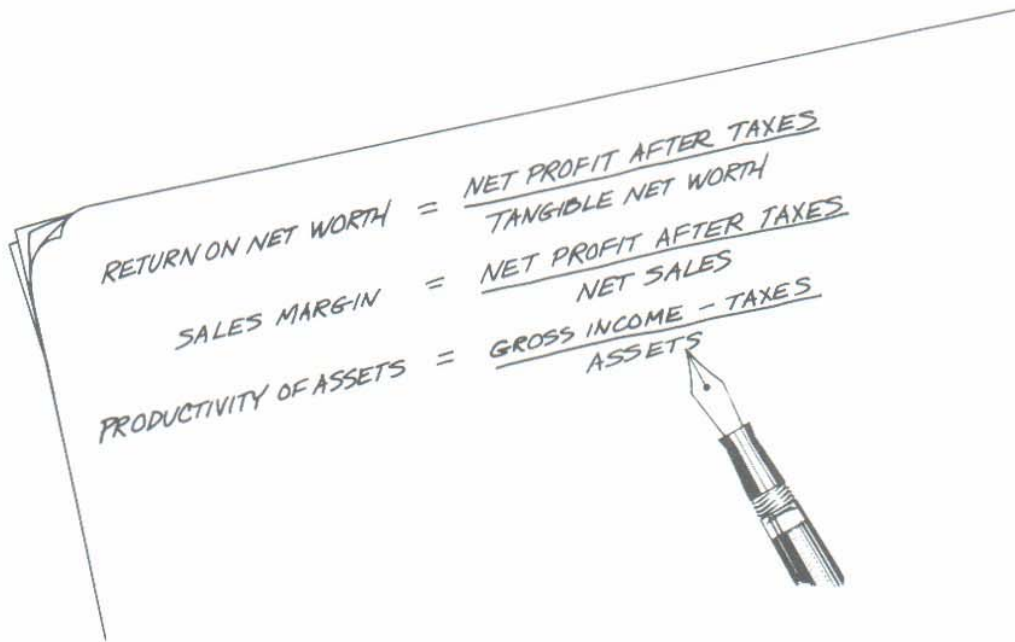
If you are not using the Management Reports System menu program, change line 6099 to:

```
6099 MENU
```

Profitability Ratio Analysis

Profitability ratios are a measure used by investors to judge a company's performance per dollar invested. The fair average for these figures will vary

from industry to industry. Low profitability ratios could indicate that the company is in a low-growth industry, perhaps with good long-term security. Low ratios would also appear in industries that must direct a lot of income into research, advertising, or other nontangible assets. Alternatively, a low ratio may mean that a company's management is less efficient than that of other companies in the same industry. If you're not used to dealing with ratios, here are a few calculations to help you understand how profitability ratios are figured.



Sample Run

Our PROFIT.BA program figures profitability ratios, using income/expense data from the MDATA.DO file. One sample run might display the following calculated values:

PROFITABILITY RATIOS

```
RETURN ON NET WORTH    =  0.160
SALES MARGIN           =  0.240
PRODUCTIVITY OF ASSETS =  0.102
```

PRESS ANY KEY TO CONTINUE?

Note that if you are not typing in the entire Management Reports System, you can use the instructions that follow the program listing to modify this program to prompt for the essential values: net income after

taxes, tangible net worth (equity), net sales, gross income, taxes, and total assets.

Program Listing

The next four programs have lines 6771-8999 in common. Some of these lines also appeared in the previous programs in this chapter. You can PASTE them from program to program as you type the programs in.

```
6100 REM PROFIT,BA
6101 GOSUB 7000
6111 CLS:PRINT"PROFITABILITY RATIOS
6121 PRINT
6131 IF TE-GW=0 THEN RN=0 ELSE RN=NT/(TE-GW)
6132 PRINT USING"RETURN ON NET WORTH      = ##,###";RN
6141 IF NS=0 THEN SM=0 ELSE SM=NT/NS
6142 PRINT USING"SALES MARGIN              = ##,###";SM
6151 IF AS=0 THEN PA=0 ELSE PA=(GI-TX)/AS
6152 PRINT USING"PRODUCTIVITY OF ASSETS = ##,###";PA
6161 PRINT
6771 PRINT
6775 GOSUB 9000
6799 LOAD"REPORT,BA",R
7000 OPEN"RAM:MDATA.DO"FOR INPUT AS 1
7010 INPUT #1,D1$,SB,NS,OI,GS,OP,DP,OE,TX,DV,CB,
D2$,AR,BD,IN,PP,ME,RE,ES,DA,GW,AP,ST,TA,LT,CS,XX:CLOSE
8000 GP=NS-GS:GO=GP-OP:NO=GO-DP:GI=NO+OI:NI=GI-OE
8010 NT=NI-TX:E1=NT-DV:E2=E1+SB
8500 CA=CB+AR-BD+IN+PP:OA=ME+RE-DA+ES:AS=CA+OA+GW
8510 CL=AP+ST+TA:TE=CL+LT+CS+E2
8999 RETURN
9000 PRINT "PRESS ANY KEY TO CONTINUE";
9010 A$=INKEY$:IF A$=""THEN 9010 ELSE RETURN
```

Notice that this and the other ratio analysis programs include code that checks to see if the divisor is zero; if it is, the program displays zero. Without this special checking, the program would abort whenever a division by zero was attempted.

If you will not be using the Management Reports System menu program, change line 6799 to:

```
6799 MENU
```

or

```
6799 LOAD"RATIOS.BA",R
```

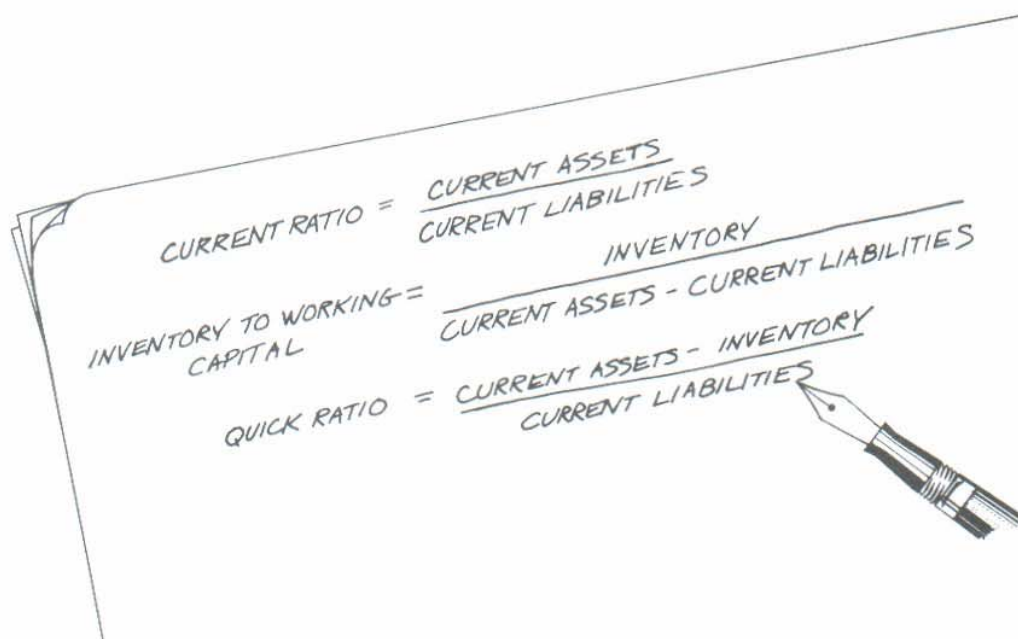
(assuming you are using the menu program RATIOS.BA)

If you are not using the MDATA.DO file to store the raw data for this program, omit lines 6101 and lines 7000-8999 and add the lines below to prompt for the essential values.

```
6101 CLS:PRINT"PROFITABILITY ANALYSIS"
6102 INPUT"NET SALES";NS
6103 INPUT"GROSS INCOME";GI
6104 INPUT"TAXES";TX:NT=GI-TX
6105 INPUT"FIXED ASSETS";OA
6106 INPUT"CURRENT ASSETS";CA:AS=OA+CA
6109 INPUT"TANGIBLE EQUITY";TE
```

Liquidity Ratio Analysis

The next program calculates four different liquidity ratios for a business, as well as its net working capital. *Net working capital* is simply current assets minus current liabilities; that is, how much of a firm's assets will be left over after meeting short-term obligations. Note that this figure can be misleading in judging liquidity, since inventory is counted as part of current assets, but it might not be easy to convert inventory to cash. Analysts therefore use other methods of measuring liquidity, including current ratio, quick ratio, inventory-to-working-capital ratio, and current-debt-to-inventory ratio. You could write out formulas for calculating these ratios that would look like this.



Hand-drawn formulas for liquidity ratios on a notepad:

$$\text{CURRENT RATIO} = \frac{\text{CURRENT ASSETS}}{\text{CURRENT LIABILITIES}}$$
$$\text{INVENTORY TO WORKING-CAPITAL} = \frac{\text{INVENTORY}}{\text{CURRENT ASSETS} - \text{CURRENT LIABILITIES}}$$
$$\text{QUICK RATIO} = \frac{\text{CURRENT ASSETS} - \text{INVENTORY}}{\text{CURRENT LIABILITIES}}$$

Current ratio measures a company's ability to meet its short-term obligations. It is the simple result of dividing current assets by current liabilities. Values below 1.5 may indicate that the firm is having trouble paying its bills. Values over 3 or 4 may mean that the firm is not making efficient use of its assets.

Generally, if the *inventory-to-working-capital ratio* is high, it means that a lot of money is tied up in inventory. A company in this situation may have trouble raising funds in an emergency. If the ratio is low, on the other hand, the company may have trouble meeting the demands of its customers during heavy sales periods. The appropriate range for this ratio varies from industry to industry.

The *debt-to-inventory ratio* measures a firm's dependence on sales as a source of funds. A high ratio indicates that the firm may need to liquidate its inventory to raise funds in a pinch.

Quick ratio is another measure of a firm's ability to raise cash quickly in an emergency.

Sample Run

Our LIQUID.BA program reads income/expense entries from the MDATA.DO file and displays the following calculated values:

```
LIQUIDITY RATIOS
CURRENT RATIO          = 4.609
INVENTORY TO WORK,CAP, = 0.482
CURR,DEBT TO INVENTORY = 0.575
QUICK RATIO            = 2.870
NET WORKING CAPITAL    = $4,150
```

PRESS ANY KEY TO CONTINUE?

If you are not typing in the entire Management Reports System, use the instructions following the listing for modifying this program to prompt for the essential values: current assets, current liabilities, and inventory.

Program Listing

```
6200 REM LIQUID.BA (1000 bytes)
6201 GOSUB 7000
6211 CLS:PRINT"    LIQUIDITY RATIOS"
6221 IF CL=0 THEN CR=0 ELSE CR=CA/CL
6222 PRINT USING"CURRENT RATIO          = ##,###";CR
6231 IF CA-CL=0 THEN IW=0 ELSE IW=IN/(CA-CL)
6232 PRINT USING"INVENTORY TO WORK,CAP, = ##,###";IW
```



```

6241 IF IN=0 THEN DI=0 ELSE DI=CL/IN
6242 PRINT USING"CURR,DEBT TO INVENTORY = ##.###";DI
6251 IF CL=0 THEN QR=0 ELSE QR=(CA-IN)/CL
6252 PRINT USING"QUICK RATIO          = ##.###";QR
6261 PRINT USING"NET WORKING CAPITAL    =$$$$$$$, ";CA-CL
6271 PRINT
6771 GOSUB 9000
6799 LOAD"REPORT,BA",R
7000 OPEN"RAM:MDATA.DO"FOR INPUT AS 1
7010 INPUT #1,D1$,SB,NS,OI,GS,OP,DP,OE,TX,DV,CB,
D2$,AR,BD,IN,PP,ME,RE,ES,DA,GW,AP,ST,TA,LT,CS,XX:CLOSE
8000 GP=NS-GS:GO=GP-OP:NO=GO-DP:GI=NO+OI:NI=GI-OE
8010 NT=NI-TX:E1=NT-DV:E2=E1+SB
8500 CA=CB+AR-BD+IN+PP:OA=ME+RE-OA+ES:AS=CA+OA+GW
8510 CL=AP+ST+TA:TE=CL+LT+CS+E2
8999 RETURN
9000 PRINT "PRESS ANY KEY TO CONTINUE";
9010 A$=INKEY$:IF A$=""THEN 9010 ELSE RETURN

```

If you will not be using the Management Reports System menu program, change line 6799 to:

```
6799 MENU
```

or

```
6799 LOAD"RATIOS,BA",R
```

If you are not using the MDATA.DO file to store the raw data for this program, omit lines 6201 and lines 7000-8999 and add the lines below to prompt for the essential values.

```

6201 CLS:PRINT"LIQUIDITY RATIO ANALYSIS
6203 INPUT"INVENTORY VALUE";IN
6206 INPUT"CURRENT ASSETS";CA:AS=OA+CA
6207 INPUT"CURRENT LIABILITIES";CL

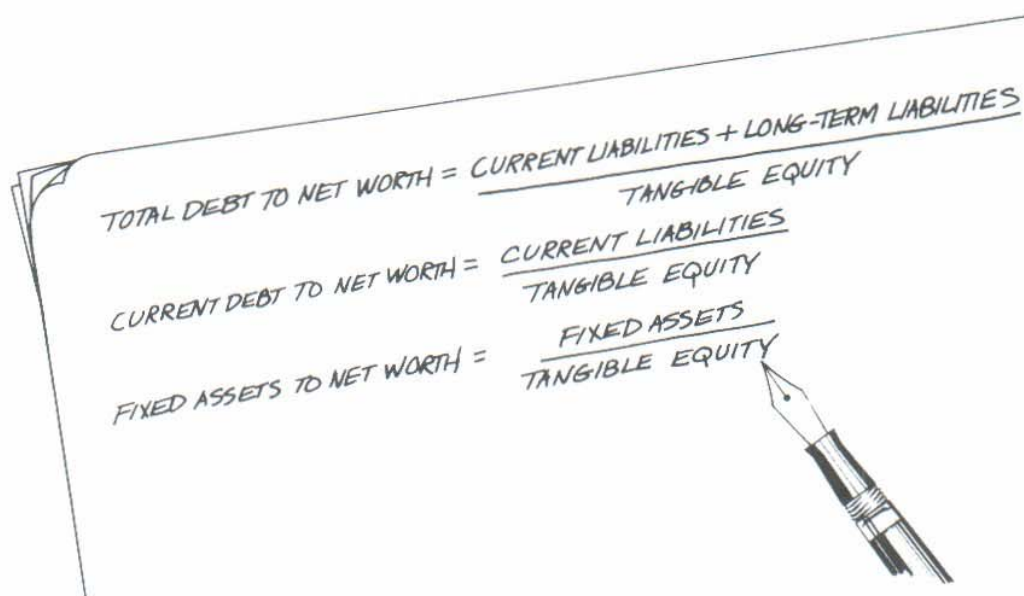
```

Leverage Analysis

Leverage analysis can come into play whenever a firm seeks loans as outside funds. Our leverage analysis program provides three measures of a company's ability to pay back its debts: total debt to net worth, current debt to net worth, and fixed assets to net worth.

If the *total debt/net worth ratio* of a company is high, it indicates that the company has many contractual obligations to pay creditors. However, the *current debt/net worth ratio* is often a better indication of a firm's short-term

position. Capital-intensive industries usually have a higher *fixed assets/net worth ratio* than service industries. Here are these ratios in a nutshell.



Sample Run

The LVRAGE.BA program reads MDATA.DO and displays the following calculated values:

```
LEVERAGE ANALYSIS
TOTAL DEBT/NET WORTH   =  0.307
CURRENT DEBT/NET WORTH =  0.307
FIXED ASSETS/NET WORTH =  0.027
PRESS ANY KEY TO CONTINUE?
```

If you are not typing in the entire Management Reports System, use the instructions following the program listing to modify this program to prompt for the essential values.

Program Listing

```
6300 REM LVRAGE.BA (727 bytes)
6301 GOSUB 7000
6311 CLS:PRINT"LEVERAGE ANALYSIS
6321 PRINT
6331 IF TE-GW=0 THEN 6332 ELSE 6333
6332 PRINT"EQUITY = 0":PRINT:GOTO 6771
6333 PRINT USING"TOTAL DEBT/NET WORTH   = ##,###";(CL+LT)/(TE-GW)
6341 PRINT USING"CURRENT DEBT/NET WORTH = ##,###";CL/(TE-GW)
6351 PRINT USING"FIXED ASSETS/NET WORTH = ##,###";OA/(TE-GW)
```



```

6361 PRINT
6771 GOSUB 9000
6799 LOAD"REPORT.BA",R
7000 OPEN"RAM:MDATA.DO"FOR INPUT AS 1
7010 INPUT #1,D1$,SB,NS,OI,GS,OP,DP,OE,TX,DV,CB,
D2$,AR,BD,IN,PP,ME,RE,ES,DA,GW,AP,ST,TA,LT,CS,XX:CLOSE
8000 GP=NS-GS:GO=GP-OP:NO=GO-DP:GI=NO+OI:NI=GI-OE
8010 NT=NI-TX:E1=NT-DV:E2=E1+SB
8500 CA=CB+AR-BD+IN+PP:OA=ME+RE-DA+ES:AS=CA+OA+GW
8510 CL=AP+ST+TA:TE=CL+LT+CS+E2
8999 RETURN
9000 PRINT "PRESS ANY KEY TO CONTINUE";
9010 A$=INKEY$:IF A$=""THEN 9010 ELSE RETURN

```

If you will not be using the Management Reports System menu program, change line 6799 to:

```
6799 MENU
```

or

```
6799 LOAD"RATIOS.BA",R
```

If you are not using the MDATA.DO file to store the raw data for this program, omit lines 6301 and lines 7000-8999 and add the lines below to prompt for the essential values: current liabilities, long-term liabilities, tangible equity, and fixed assets.

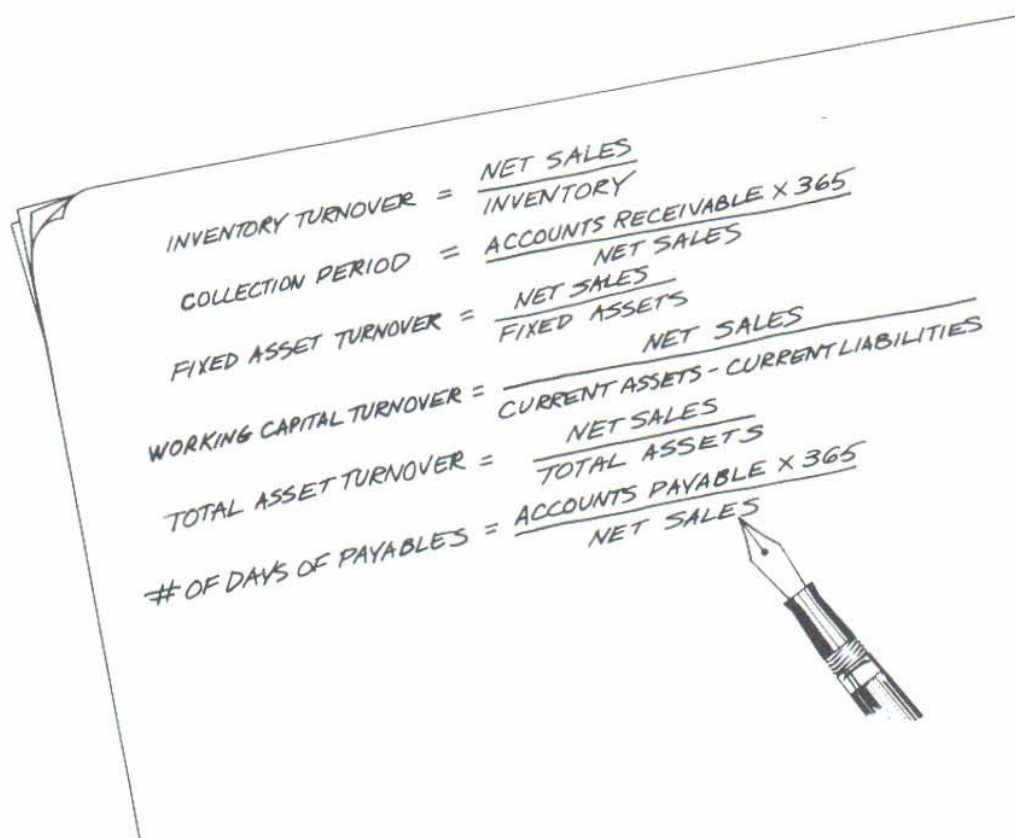
```

6301 CLS:PRINT"LEVERAGE ANALYSIS
6305,INPUT"FIXED ASSETS";OA
6307 INPUT"CURRENT LIABILITIES";CL
6308 INPUT"LONG-TERM LIABILITIES";LT
6309 INPUT"TANGIBLE EQUITY";TE

```

Activity Ratio Analysis

Activity ratios measure the efficiency of a firm's operations according to the degree to which the firm's assets are used to generate sales. On the next page are several activity ratios and their formulas.



Sample Run

Our ACTIVE.BA program reads MDATA.DO and displays the following calculated sample values.

```
ACTIVITY ANALYSIS
INVENTORY TURNOVER      = 1.250
COLLECTION PERIOD       =146.000
FIXED ASSET TURNOVER    = 25.000
WORKING CAP. TURNOVER   = 0.602
TOTAL ASSET TURNOVER    = 0.424
NO. DAYS OF PAYABLES    = 73.000
PRESS ANY KEY TO CONTINUE?
```

Program Listing

If you are not storing essential data in MDATA.DO, you can omit lines 7000-8999 and add the extra lines shown following this listing.

```
6400 REM ACTIVE.BA
6410 GOSUB 7000
6411 CLS:PRINT"ACTIVITY ANALYSIS"
6421 IF IN=0 THEN IT=0 ELSE IT=NS/IN
```



```

6422 PRINT USING"INVENTORY TURNOVER    =   ##,###";IT
6431 IF NS=0 THEN CP=0 ELSE CP=(AR*365)/NS
6432 PRINT USING"COLLECTION PERIOD      =   ##,###";CP
6441 IF OA=0 THEN FA=0 ELSE FA=NS/OA
6442 PRINT USING"FIXED ASSET TURNOVER   =   ##,###";FA
6451 IF CA-CL=0 THEN WC=0 ELSE WC=NS/(CA-CL)
6452 PRINT USING"WORKING CAP.TURNOVER  =   ##,###";WC
6461 IF AS=0 THEN TA=0 ELSE TA=NS/AS
6462 PRINT USING"TOTAL ASSET TURNOVER   =   ##,###";TA
6471 IF NS=0 THEN DP=0 ELSE DP=(AP*365)/NS
6472 PRINT USING"NO. DAYS OF PAYABLES  =   ##,###";DP
6771 GOSUB 9000
6799 LOAD"REPORT.BA",R
7000 OPEN"RAM:MDATA.DO"FOR INPUT AS 1
7010 INPUT #1,D1$,SB,NS,OI,GS,OP,DP,OE,TX,DV,CB,
D2$,AR,BD,IN,PP,ME,RE,ES,DA,GW,AP,ST,TA,LT,CS,XX:CLOSE
8000 GP=NS-GS:GO=GP-OP:NO=GO-DP:GI=NO+OI:NI=GI-OE
8010 NT=NI-TX:E1=NT-DV:E2=E1+SB
8500 CA=CB+AR-BD+IN+PP:OA=ME+RE-DA+ES+GW:AS=CA+DA
8510 CL=AP+ST+TA:TE=CL+LT+CS+E2
8999 RETURN
9000 PRINT "PRESS ANY KEY TO CONTINUE";
9010 A$=INKEY$:IF A$=""THEN 9010 ELSE RETURN

```

If you will not be using the Management Reports System menu program, change line 6799 to:

```
6799 MENU
```

or

```
6799 LOAD"RATIOS.BA",R
```

If you are not using the MDATA.DO file to store the raw data for this program, omit lines 6410 and lines 7000-8999 and add the lines below to prompt for the essential values: net sales, inventory, accounts receivable, fixed assets, current assets, and current liabilities.

```

6401 CLS:PRINT"ACTIVITY ANALYSIS
6402 INPUT"NET SALES";NS
6403 INPUT"INVENTORY VALUE";IN
6404 INPUT"ACCOUNTS RECEIVABLE";AR
6405 INPUT"FIXED ASSETS";OA
6406 INPUT"CURRENT ASSETS";CA:AS=OA+CA
6407 INPUT"CURRENT LIABILITIES";CL

```

Whether you're analyzing your own company or someone else's, we think you'll have a pretty accurate idea of the business's state of health after you let the programs in this chapter give it a complete checkup. Good luck in doctoring any problems you may find!

6

Investment Analysis

Investment Analysis Programs

- Bond investment analysis
- Stock investment analysis (giving break-even price)
- Stock sale analysis (based on new quote)
- Return on investment with regular cash inflow
- Return on investment with irregular inflow
- Comparison of several stock offerings

Investment Summary and File Maintenance

- Display summary of current investments
- Add a new investment
- Display details and update current investment data
- Delete an investment

*E*ven if you have only a small amount of extra money to invest, you probably have considered putting it in stocks or bonds rather than in a savings account. The risk is greater, but the return on investment can also be much greater if your portfolio is properly managed.

To get the most out of stock and bond investments, you need to be able to analyze them effectively and keep track of them accurately. Analysis can tell you when to buy and when to sell for maximum profit. Whether you are an individual investor, a member of an investment club, or simply someone who wants to learn more about the stock market, you are sure to find the investment analysis and maintenance programs in this chapter useful. They may also help you keep track of the progress of your own company's stock and attract new investors. Your Model 100 probably won't completely replace your stockbroker, but it's likely to be a lot easier to get hold of when you're in a hurry!

The six short programs in the first part of this chapter perform the essential functions of investment analysis. Here's a list of them:

- BONDS.BA — bond investment analysis
- STOCK1.BA — stock investment analysis (giving break-even price)
- STOCK2.BA — stock sale analysis (based on new quote)
- ROIREG.BA — return on investment with regular cash inflow
- ROIVAR.BA — return on investment with irregular inflow
- COMPAR.BA — comparison of several stock offerings

Each program can be typed in and run on its own, without any additional programs or data files. Optionally, you can add a data file, called FOLIO.DO, where you can store information about investments you have made. (You can also use it to track several options *before* investing.) The investment data file contains these values (as applicable) for each investment:

Values for FOLIO.DO

T\$	Investment type: B = Bond, S = Stock, N = Note, O = Other
N\$	Name of investment
PP	Purchase price per share or per bond
QTY	Number of shares or bonds purchased
BC	Broker's commission on purchase transaction
PV	Purchase value, including commission ($PP * QTY + BC$)
D1\$	Date of purchase
D2\$	Maturity date, or date of latest quote
FV	Future value, as of maturity date or based on last quote
RA	Annual interest or return on investment
PMT	Amount of periodic payments (dividends, interest, etc.)
YR	Term of investment
PER	Number of periodic payments per year

If you decide to use the optional FOLIO.DO file to store investment data, you will also want to type in one or more of these programs, which are described in the last part of the chapter:

- SUMMARY.BA — display summary of current investments
- ADDREC.BA — add a new investment

UPDATE.BA — display details and update current investment data

DELETE.BA — delete an investment

These programs can help you keep track of your investments and keep your investment records up to date.

If you are not going to use FOLIO.DO, you can save about 185 bytes in many of the analysis programs by omitting lines 9000-9010 and the references to them in lines 270 and 290.

Finally, at the end of the chapter you will find an optional menu program named FOLIO.BA that ties these programs together. If you wish, you can adapt it to use only those programs that you decide to type in. If you decide not to use FOLIO.BA, you will need to change line 999 in most of the programs throughout this chapter from

```
999 LOAD "FOLIO.BA",R
```

to

```
999 MENU
```

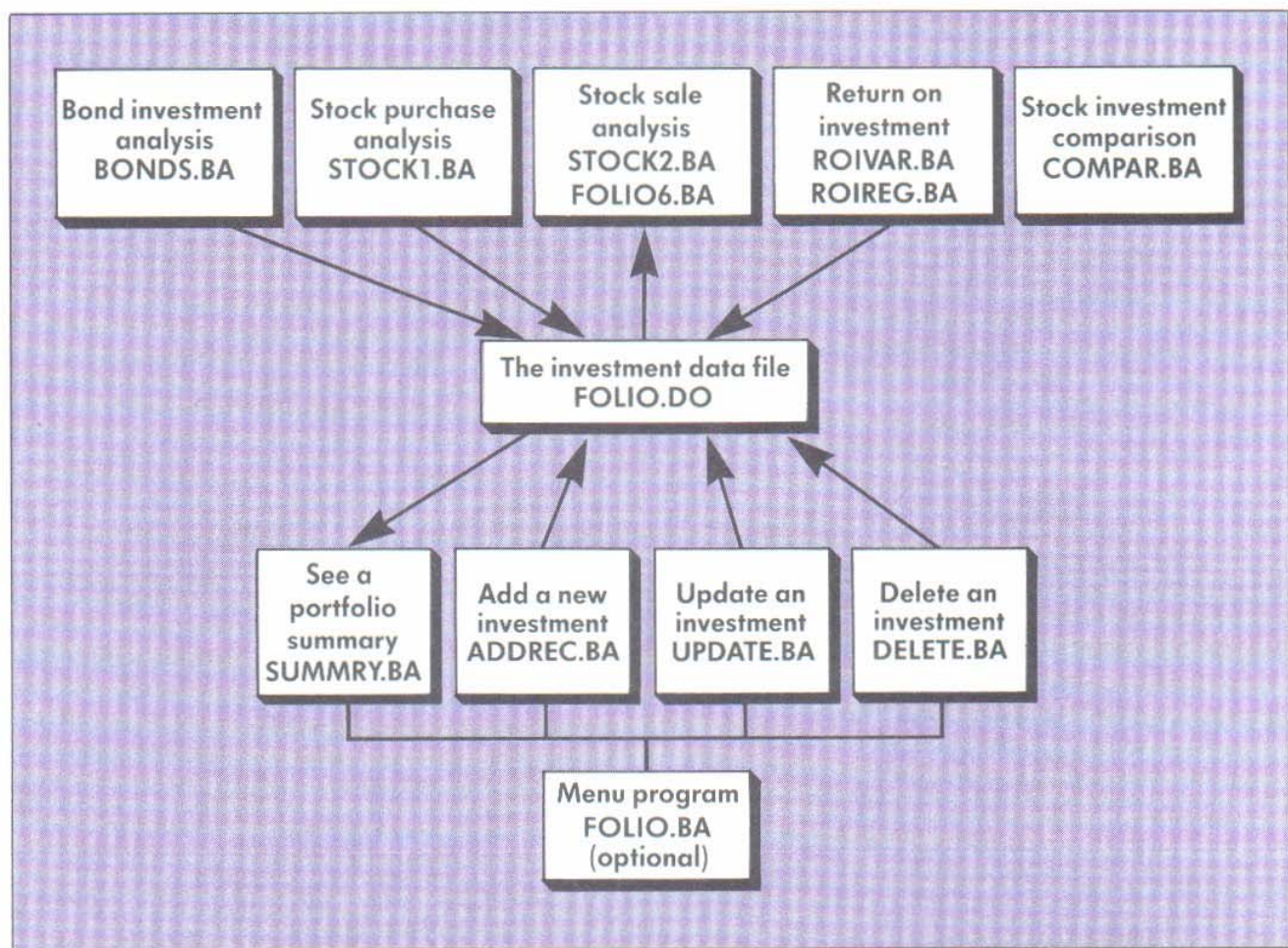
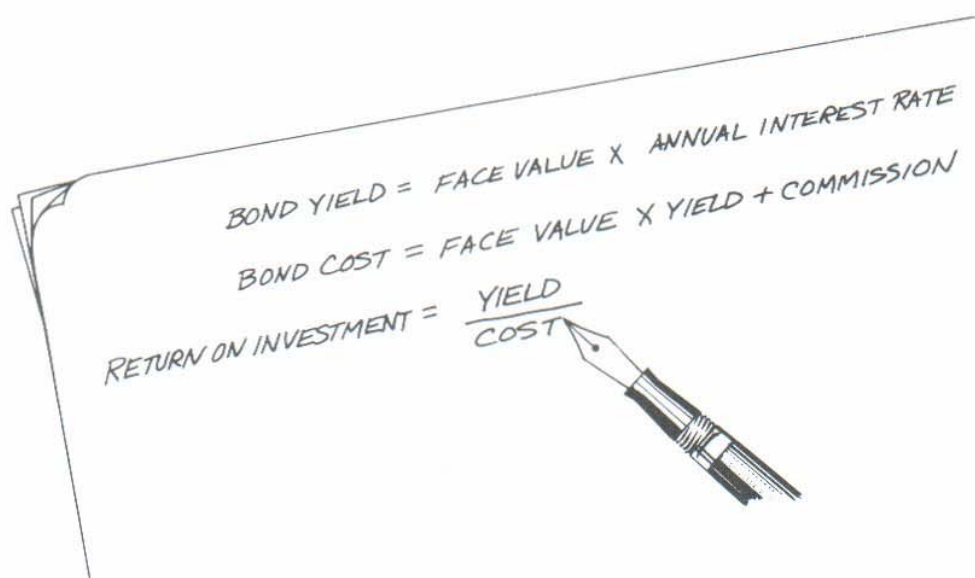


Figure 6-1. The investment analysis system

Bond Investment Analysis

Investing in bonds is usually a safe alternative to depositing money in a savings account. Bonds are notes that earn a fixed annual rate of interest over the life of the investment and pay back the principal, or *par value*, on the maturity date. Two kinds of bonds are frequently sold on the financial market: corporate and municipal. Municipal bonds carry the lower rate of interest, but the interest is usually tax exempt, making them attractive investments for tax-conscious investors.

Though the interest rate is fixed for a particular bond issue, bond prices fluctuate as commercial interest rates vary — bond prices rise when interest rates fall, and vice versa. Many investors try for short-term gains by buying bonds when the interest rate is high and selling when the interest rate bottoms out. Here's how you can figure return on investment for bonds:



Hand-drawn formulas on a notepad:

$$\begin{aligned}\text{BOND YIELD} &= \text{FACE VALUE} \times \text{ANNUAL INTEREST RATE} \\ \text{BOND COST} &= \text{FACE VALUE} \times \text{YIELD} + \text{COMMISSION} \\ \text{RETURN ON INVESTMENT} &= \frac{\text{YIELD}}{\text{COST}}\end{aligned}$$

Sample Run

Our bond investment analysis program, BONDS.BA, begins by asking six questions:

```
BOND INVESTMENT ANALYSIS
BOND NAME? MUNI
FACE/PAR AMOUNT? 1000
SELECT QUOTE FORMAT (%):
  1-DECIMAL  2-32NDS? 1
  QUOTE AS ###,##? 90
BROKER'S COMMISSION ($ PER BOND)? 10
STATED YIELD OF BOND? 10
```


Notice that the price quote can be entered either in decimal format (###.##) or in 32nds. In decimal format the quoted price is entered as a percent of the face value of the bond; that is, a quote of 90 implies a purchase price of \$900 for a \$1000 bond.

The program uses the entered information to calculate the total investment cost including commission, the annual interest payments in dollars, and the return on investment.

```
BOND INVESTMENT ANALYSIS
BOND NAME           = MUNI
$-PRICE QUOTED      = 90.00
COST W/ COMM.       = 910.00
ANNUAL $-INTEREST   = $100.00
RETURN ON INVEST,   = 10.99 %
```

```
ENTER 1-REPLAY 2-SAVE 9-EXIT? 1
```

Here's another sample run of the program, this time using the nondecimal quote format.

```
BOND INVESTMENT ANALYSIS
BOND NAME? SFUSD
FACE/PAR AMOUNT? 2000
SELECT QUOTE FORMAT:
  1-DECIMAL  2-32NDS? 2
EXAMPLE: 21+3/4 = 21+24/32 = 21,24
QUOTE AS ###,##? 87,24
BROKER'S COMMISSION ($ PER BOND)? 15
STATED YIELD OF BOND? 15
```

You can see that when the user selects option 2 — to enter the quote in 32nds — a new line appears on the screen. This extra line shows that a price of $21\frac{3}{4}$, for example, is equivalent to $21\frac{24}{32}$, which would be entered as "21,24". The integer and the number of 32nds is separated by a comma. In this example, the price is $87\frac{3}{4}$, which is the same as $87\frac{24}{32}$, which can be entered as 87,24.

```
BOND INVESTMENT ANALYSIS
BOND NAME           = SFUSD
$-PRICE QUOTED      = 87.75
COST W/ COMM.       = 1770.00
ANNUAL $-INTEREST   = $300.00
RETURN ON INVEST,   = 16.95 %
```

```
ENTER 1-REPLAY 2-SAVE 9-EXIT? 2
```

Selecting option 2-SAVE causes this bond entry to be stored in the file FOLIO.DO, making it available for some of the other programs described later in this chapter.

Program Listing

If you type this program exactly as shown below, it will fit in with the rest of the programs in the FOLIO system. If you are not going to save information about your investments in a file, remember that you can save about 185 bytes here and in the programs that follow by omitting lines 9000-9010 and the references to them in lines 270 and 290.

```

100 REM BONDS,BA
101 DEFSNG A-Z
110 CLS:PRINT"BOND INVESTMENT ANALYSIS"
120 INPUT" BOND NAME";N$
130 INPUT" FACE/PAR AMOUNT";FV
140 PRINT" SELECT QUOTE FORMAT:
150 INPUT" 1-DECIMAL 2-32NDS";A:ON A GOTO 161,162
161 INPUT" QUOTE AS ###,##";PP:GOTO 170
162 PRINT" EXAMPLE: 21+3/4 = 21+24/32 = 21,24
163 INPUT" QUOTE AS ###,##";C1,C2:PP=C1+C2/32
170 INPUT" BROKER'S COMMISSION ($ PER BOND)";BC
180 INPUT" STATED YIELD OF BOND";BY
190 GOSUB 800
200 CLS:PRINT"BOND INVESTMENT ANALYSIS"
220 PRINT" BOND NAME          = ";N$
230 PRINT USING" $-PRICE QUOTED      = ####,##";PP
240 PRINT USING" COST W/ COMM,       = ####,##";PV
250 PRINT USING" ANNUAL $-INTEREST = $####,##";PMT
260 PRINT USING" RETURN ON INVEST, = ##,## %";RA
270 PRINT:INPUT"ENTER 1-REPLAY 2-ADD TO FOLIO 9-EXIT";A
290 ON A GOTO 100,9000,,,,,,999
800 PV=(FV*PP/100)+BC:PMT=FV*BY/100:RA=PMT*100/PV:RETURN
999 LOAD"FOLIO.BA",R
9000 OPEN"RAM:FOLIO.DO"FOR APPEND AS 1
9005 T$="B":D1$=DT$
9010 PRINT #1,T$,"N$","PP","QTY","BC","PV","D1$","
"D2$","FV","RA","PMT","YR","PER:CLOSE:GOTO 999

```

If you will not be using the Investment Analysis menu program (FOLIO.BA) shown at the end of this chapter, remember to change line 999 to:

```
999 MENU
```


Stock Investment Analysis

Bonds promise to pay face value on some specified maturity date, but stocks come with no such guarantee. The price of a stock is set daily through sophisticated “haggling” between buyers and sellers. The voting members of a corporation decide whether or how large a dividend will be issued per share to shareholders. Income from a stock investment includes net profit on the sale of the stock (the price the investor sells it for, less the purchase price) and any dividends received during the term of ownership.

Many investors evaluate their stock investments simply in terms of purchase price vs. sale value. Dividends are not included in their preliminary evaluations, since they plan to sell their stocks after only a short time. Our next program, STOCK1.BA, performs this kind of analysis. (The UPDATE.BA program, shown later in this chapter, allows entry of dividend earnings.)

Sample Run

The program begins by asking four questions for the user to answer in turn.

```
STOCK PURCHASE INVESTMENT ANALYSIS
STOCK NAME? KIWI
NUMBER OF SHARES? 25
CURRENT QUOTE AS 'INTEGER,32NDS':
EXAMPLE: 21+3/4 = 21+24/32 = 21.24
CURRENT PRICE QUOTE AS ###,##? 19.8
COMMISSION AS 'BASE FEE,PERCENT':
EXAMPLES: $18+1.2% = 18.12
           $36+0.6% = 36.06
           $57+0.3% = 57.03
COMMISSION AS ###,##,##? 18.12
```

Once this basic data is entered, the program calculates the total cost including commission, the “break-even” resale price, and the net profit per point over that price. In the case shown here, an investor has bought twenty-five shares of stock at the quoted price of \$19.25 per share (plus commission). Our investor would break even if he or she sold the stock when the market price reached \$21.25 per share. For every point *over* \$21.25, the investor would make \$26.55 if all twenty-five shares were sold. In other words, if each share were sold at \$23.25, the investor would make \$53.10 (2 X 26.55).

```

STOCK PURCHASE INVESTMENT ANALYSIS
STOCK NAME           = KIWI
NUMBER OF SHARES     = 25
$-PRICE QUOTED       = 19,25
COST W/ COMM,         = $ 505,025
BREAK-EVEN SALE PRICE = 21,25
NET PROFIT ON SALE    = $ 26,55
(PER POINT OVER 21,25)
ENTER 1-REPLAY 2-SAVE 9-EXIT? 2

```

By selecting the option 2-SAVE, the user saves information about this stock purchase in the data file FOLIO.DO. The menu of portfolio options is displayed by the menu program FOLIO.BA, described at the end of this chapter.

Commissions are charged when an investor sells a stock as well as when the investor buys. In a typical commission structure for a discount broker, transactions with a dollar value up to \$3,000 might have a commission of \$18 + 1.2% of the principal amount; for transactions with a value between \$3,001 and 7,000, the commission of \$36 + 0.6%; for transactions between \$7,001 and 56,000, the commission would be \$57 + 0.3%, and so on.

Program Listing

If you type this program exactly as shown below, it will fit in with the rest of the programs in the FOLIO system. As before, if you are not going to be saving information about your investments, you can save about 185 bytes here by omitting lines 9000-9010 and the references to them in lines 270 and 290.

```

100 REM STOCK1.BA
105 DEFSNG A-Z
112 CLS:PRINT"STOCK PURCHASE INVESTMENT ANALYSIS
122 INPUT" STOCK NAME ";N$
132 INPUT" NUMBER OF SHARES";QTY
140 PRINT" CURRENT QUOTE AS 'INTEGER,32NDS':
162 PRINT" EXAMPLE: 21+3/4 = 21+24/32 = 21,24
163 INPUT" CURRENT PRICE QUOTE AS ###,##";C1,C2:PP=C1+C2/32
170 PRINT" COMMISSION AS 'BASE FEE,PERCENT':
180 PRINT" EXAMPLES: $18+1,2% = 18,1,2
182 PRINT" $36+0,6% = 36,0,6
184 PRINT" $57+0,3% = 57,0,3
190 INPUT" COMMISSION AS ###,##,##";B1,B2:B2=B2/100
195 GOSUB 800
200 CLS:PRINT"STOCK PURCHASE INVESTMENT ANALYSIS
220 PRINT" STOCK NAME = ";N$
225 PRINT" NUMBER OF SHARES = ";QTY

```



```

230 PRINT" $-PRICE QUOTED      =";PP
240 PRINT" COST W/ COMM,      = $";PV
250 PRINT" BREAK-EVEN SALE PRICE = ";BE
260 PRINT" NET PROFIT ON SALE   = $";NP
265 PRINT" (PER POINT OVER"BE")
280 INPUT"ENTER 1-REPLAY 2-ADD TO FOLIO 9-EXIT";A
290 ON A GOTO 100,9000,,,,,,999
800 PV=(QTY*PP)+B1+(B2*PP*QTY):SP=PP
810 SP=SP+1:SOUND 4000,1
820 FV=(QTY*SP)-B1-B2*SP*QTY
830 IF FV>PV THEN GOTO 840 ELSE GOTO 810
840 BE=SP:SP=SP+1:FV=(QTY*SP)-(B1+(B2*SP*QTY))
850 NP=FV-PV:RETURN
999 LOAD"FOLIO,BA",R
9000 OPEN"RAM:FOLIO,DO"FOR APPEND AS 1
9005 T$="S":D1$=DT$
9010 PRINT #1,T$,"N$","PP","QTY","BC","PV","D1$","
"D2$","FV","RA","PMT","YR","PER:CLOSE:GOTO 999

```

Stock Sale Analysis

The previous program calculated the break-even selling price and net profit per point over break-even level — questions many investors like to ask before they buy a stock. You can use this next program when you are about to sell stocks, to evaluate the profit on the sale given the current market price.

Sample Run

The program begins by prompting for five entries:

```

STOCK SALE ANALYSIS
STOCK NAME? QP DOLL
NUMBER OF SHARES? 10
ENTER QUOTES AS 'INTEGER,32NDS':
EXAMPLE: 21+3/4 = 21+24/32 = 21,24
PURCHASE PRICE AS ###,##? 48,24
SELLING PRICE AS ###,##? 56,25
BROKER'S COMMISSION AS FEE,PERCENT:
EXAMPLES: $18+1,2% = 18,1,2
           $36+0,6% = 36,0,6
           $57+0,3% = 57,0,3
COMMISSION AS ###,##,##? 18,1,2

```

Based on the entered information, the program calculates the net profit on the sale of the stock, including commissions at the time of sale and at the time of purchase.

```

STOCK NAME      = QP DOLL
PURCHASE        = 10 SHARES @ 48.75
COST W/ COMM,   = $ 511.35
SELLING PRICE   = 56.7813
SALE VALUE -COMM, = $ 542.999
NET PROFIT ON SALE = $ 31.649
RETURN ON INVESTMENT = 1.06189
ENTER 1-REPLAY 9-EXIT? 9

```

Program Listing

If you are not going to save information about your investments, then code the STOCK2.BA program, the first listing below. This is the program that produced the sample run previously shown.

If you are saving information in the FOLIO.DO file, the second program listing, FOLIO6.BA, will perform the same analysis as STOCK2.BA on any stock saved in your FOLIO.DO file.

```

100 REM STOCK2.BA
105 DEFSNG A-Z
112 CLS:PRINT"STOCK SALE ANALYSIS
122 INPUT" STOCK NAME";N$
132 INPUT" NUMBER OF SHARES";QTY
140 PRINT" ENTER QUOTES AS 'INTEGER,32NDS':
162 PRINT"   EXAMPLE: 21+3/4 = 21+24/32 = 21,24
163 INPUT"   PURCHASE PRICE AS ###,##";P1,P2:PP=P1+P2/32
164 INPUT"   SELLING PRICE AS ###,##";C1,C2:SP=C1+C2/32
170 PRINT" BROKER'S COMMISSION AS FEE,PERCENT:
180 PRINT"   EXAMPLES: $18+1.2% = 18,1.2
182 PRINT"                   $36+0.6% = 36,0.6
184 PRINT"                   $57+0.3% = 57,0.3
190 INPUT"   COMMISSION AS ###,##,##";B1,B2:B2=B2/100
195 GOSUB 800
200 CLS
220 PRINT"STOCK NAME      =" ;N$
225 PRINT"PURCHASE        =" ;QTY"SHARES @"PP
240 PRINT"COST W/ COMM,    =" ;N$ ;PV
250 PRINT"SELLING PRICE    =" ;N$ ;SP
260 PRINT"SALE VALUE -COMM, =" ;N$ ;FV
270 PRINT"NET PROFIT ON SALE =" ;N$ ;NE
280 PRINT" RETURN ON INVESTMENT =" ;N$ ;RA
290 INPUT"ENTER 1-REPLAY 9-EXIT";A
295 ON A GOTO 100,,,,,,999
800 BC=B1+(B2*PP*QTY):PV=(QTY*PP)+BC
810 BC=B1+(B2*SP*QTY):FV=(QTY*SP)-BC
820 NE=FV-PV
840 RA=(FV/PV):RETURN
999 MENU

```



```

100 REM FOLIO6.BA
103 DEFSNG A-Z
105 GOSUB 3000
112 CLS:PRINT"STOCK SALE ANALYSIS
122 PRINT" STOCK NAME ";N$
132 PRINT" NUMBER OF SHARES";QTY
140 PRINT" ENTER QUOTES AS 'INTEGER,32NDS':
162 PRINT" EXAMPLE: 21+3/4 = 21+24/32 = 21,24
163 PRINT" PURCHASE PRICE: ;PP
164 INPUT" SELLING PRICE: ;SP
170 PRINT" BROKER'S COMMISSION AS FEE,PERCENT:
180 PRINT" EXAMPLES: $18+1.2% = 18,1,2
182 PRINT" $36+0.6% = 36,0,6
184 PRINT" $57+0.3% = 57,0,3
190 INPUT" COMMISSION AS ###,##,##";B1,B2:B2=B2/100
195 GOSUB 800
200 CLS
220 PRINT" STOCK NAME =";N$
225 PRINT" PURCHASE ="QTY"SHARES @"PP
240 PRINT" COST W/ COMM, = $";PV
250 PRINT" SELLING PRICE = ";SP
260 PRINT" SALE VALUE -COMM, = $";FV
270 PRINT" NET PROFIT ON SALE = $";NE
280 PRINT"RETURN ON INVESTMENT ="RA
290 INPUT"ENTER 1-REPLAY 2-SAVE 9-EXIT";A
295 ON A GOTO 100,9000,,,,,999
800 REM BC=B1+(B2*PP*QTY):PV=(QTY*PP)+BC
810 BC=B1+(B2*SP*QTY):FV=(QTY*SP)-BC
820 NE=FV-PV
840 RA=(FV/PV):RETURN
999 LOAD"FOLIO6.BA",R
1000 PRINT T$ "N$" "$PV" "$FV" "RA"% "D2$:RETURN
3000 CLS:PRINT"SELECT STOCK FOR ANALYSIS
3010 GOSUB 8000
4000 INPUT" 1-NEXT 2-UPDATE THIS RECORD 9-EXIT";A
4010 ON A GOTO 4100,4200,,,,,4999
4100 RETURN
4200 CLOSE:GOTO 112
4999 CLOSE:GOTO 999
8000 OPEN"FOLIO6.DO"FOR INPUT AS 1
8010 INPUT #1,T$,N$,PP,QTY,BC,PV,D1$,D2$,FV,RA,PMT,YR,PER
8020 GOSUB 1000:GOSUB 4000:IF EOF(1) THEN GOTO 8030 ELSE 8010
8030 CLOSE:RETURN
9000 OPEN"RAM:FOLIO6.DO"FOR APPEND AS 1
9005 T$="S":D1$=DT$
9010 PRINT #1,T$,"N$","PP","QTY","BC","PV","D1$",
"D2$","FV","RA","PMT","YR","PER:CLOSE:GOTO 999

```

Return on Investment — Regular Flow

Some investors prefer to place their money in “notes” — personal loans to companies that promise to pay back the loan by some date, with interest. The following program analyzes an investment of this sort, in which the loan is to be repaid by a series of regular payments over time, including interest and principal. With this program, you can see how much interest you’d earn if you decide to loan money to a particular company.

Sample Run

```
RETURN ON INVESTMENT - REGULAR FLOW
INVESTMENT AMOUNT? 1000
PAYMENT AMOUNT? 100
NUMBER OF PAYMENTS PER YEAR? 12
NUMBER OF YEARS? 1
ANNUAL INTEREST RATE EARNED = 18.37 %

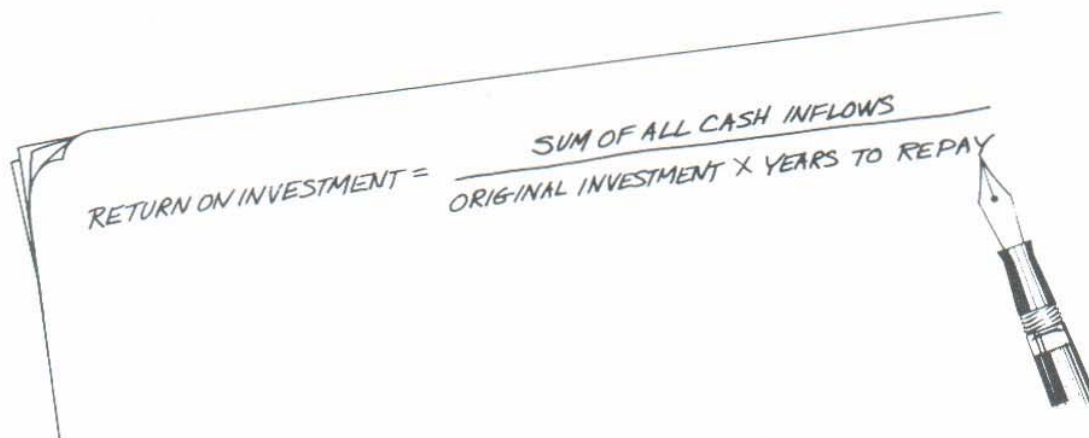
ENTER 1-REPLAY 2-SAVE 9-EXIT? 9
```

Program Listing

```
300 REM ROIREG.BA
301 DEFSNG A-Z
310 CLS:PRINT"RETURN ON INVESTMENT - REGULAR FLOW
320 INPUT" INVESTMENT AMOUNT";PV
330 INPUT" PAYMENT AMOUNT";PMT
340 INPUT" NUMBER OF PAYMENTS PER YEAR";PER
350 INPUT" NUMBER OF YEARS";YR
360 GOSUB 800
370 PRINT USING"ANNUAL INTEREST RATE EARNED = ##.## %";RA
380 PRINT:INPUT"ENTER 1-REPLAY 2-SAVE 9-EXIT";A
390 ON A GOTO 300,9000,,,,,999
800 MOS=PER*YR:FV=PMT*MOS:RA=((FV/PV)^(1/MOS)-1)*100*PER:RETURN
999 LOAD"FOLIO.BA",R
9000 OPEN"RAM:FOLIO.DO"FOR APPEND AS 1
9005 T$="S":D1$=DT$
9010 PRINT #1,T$,"N$","PP","QTY","BC","PV","D1$","
"D2$","FV","RA","PMT","YR","PER:CLOSE:GOTO 999
```


Return on Investment — Irregular Flow

This second “return on investment” program calculates the return based on a series of unequal payments per year over the life of the investment. This situation might arise in, for example, the case of a loan with a balloon payment at the end. The calculation method used by this program, shown below, is simple: sum of all cash inflows, divided by the original investment amount, times the number of years to repay.



A hand-drawn illustration of a notepad with a fountain pen resting on it. The notepad contains the following formula:

$$\text{RETURN ON INVESTMENT} = \frac{\text{SUM OF ALL CASH INFLOWS}}{\text{ORIGINAL INVESTMENT} \times \text{YEARS TO REPAY}}$$

Sample Run

```
RETURN ON INVESTMENT - IRREGULAR FLOW
INVESTMENT AMOUNT? 7500
NUMBER OF YEARS? 5
```

```
EARNINGS EXPECTED IN YEAR 1
-->? 600
EARNINGS EXPECTED IN YEAR 2
-->? 800
EARNINGS EXPECTED IN YEAR 3
-->? 1200
EARNINGS EXPECTED IN YEAR 4
-->? 1800
EARNINGS EXPECTED IN YEAR 5
-->? 2400
```

```
RETURN ON INVESTMENT = 18.1333%
```

```
ENTER 1-REPLAY 2-SAVE 9-EXIT? 9
```

Program Listing

```
400 REM ROIVAR.BA
401 DEFSNG A-Z
410 CLS:PRINT"RETURN ON INVESTMENT - IRREGULAR FLOW
420 INPUT" INVESTMENT AMOUNT";PV
430 INPUT" NUMBER OF YEARS";YR
440 PRINT:FV=(0):FOR N=1 TO YR
450 PRINT" EARNINGS EXPECTED IN YEAR ";N:INPUT" -->";PMT
:FV=FV+PMT:NEXT
460 PRINT:RI=(FV/(YR*PV))*100
470 PRINT"RETURN ON INVESTMENT ="RI"%
480 PRINT:INPUT"ENTER 1-REPLAY 2-SAVE 9-EXIT";A
490 ON A GOTO 400,9000,,,,,,999
999 LOAD"FOLIO.BA",R
9000 OPEN"RAM:FOLIO.DO"FOR APPEND AS 1
9005 T$="S":D1$=DT$
9010 PRINT #1,T$,"N$","PP","QTY","BC","PV","D1$","
"D2$","FV","RA","PMT","YR","PER:CLOSE:GOTO 999
```

Comparative Stock Analysis

When deciding what stocks to buy, investors often weigh their interests in short-term gains against long-term reliable income from dividends. The following program can help in this comparison, based on recent stock performance factors such as price, earnings, and dividends.

Sample Run

Suppose that you, as an investor, want to compare the performance of two stocks you already own — say, Kiwi Resorts and QP Doll Industries — with the performances of two other stocks recommended by your broker, F-Circuits Incorporated and Wild Card Enterprises. Once you've typed in our program, you can simply pick up your Model 100, position the cursor over COMPAR.BA on its main menu and press **ENTER**, and answer six questions about each stock, like this:

```
COMPARATIVE STOCK ANALYSIS

HOW MANY STOCKS? 4
STOCK NUMBER 1
STOCK NAME? KIWI
CURRENT PRICE? 20
HIGHEST PRICE THIS YEAR? 30
LOWEST PRICE THIS YEAR? 15
ANNUAL DIVIDEND PER SHARE? 2
ANNUAL EARNINGS PER SHARE? 8
```


STOCK NUMBER 2
 STOCK NAME? QP DOLL
 CURRENT PRICE? 50
 HIGHEST PRICE THIS YEAR? 80
 LOWEST PRICE THIS YEAR? 45
 ANNUAL DIVIDEND PER SHARE? 5
 ANNUAL EARNINGS PER SHARE? 7

STOCK NUMBER 3
 STOCK NAME? F-CIRCUITS
 CURRENT PRICE? 100
 HIGHEST PRICE THIS YEAR? 102
 LOWEST PRICE THIS YEAR? 95
 ANNUAL DIVIDEND PER SHARE? 5
 ANNUAL EARNINGS PER SHARE? 15

STOCK NUMBER 4
 STOCK NAME? WILD CARD
 CURRENT PRICE? 5
 HIGHEST PRICE THIS YEAR? 9
 LOWEST PRICE THIS YEAR? 1
 ANNUAL DIVIDEND PER SHARE? .25
 ANNUAL EARNINGS PER SHARE? 2

COMPARATIVE STOCK ANALYSIS

STOCK @	%-RETRN	P/E-RATIO	VOLATLTY
KIWI			
20.00	10.00	2.50	75.00
QP DOLL			
50.00	10.00	7.14	70.00
F-CIRCUITS			
100.00	5.00	6.67	7.00
WILD CARD			
5.00	5.00	2.50	160.00

ENTER 1-REPLAY 9-EXIT? 9

By this comparison, you can see that Kiwi and QP Doll offer higher rates of return, QP Doll and F-Circuits offer higher price/earnings ratios, and Wild Card is a highly volatile investment.

Program Listing

This program does not hook into the FOLIO.DO data file, so you can type it alone or skip it entirely without affecting the rest of the programs in this chapter.

```
600 REM COMPAR.BA
601 DEFSNG A-Z
610 CLS:PRINT"COMPARATIVE STOCK ANALYSIS
620 PRINT:INPUT" HOW MANY STOCKS";Q
630 DIMN$(Q):DIMPP(Q):DIMHP(Q):DIMLP(Q):DIMPMT(Q):DIMRE(Q):
DIMROI(Q):DIMPE(Q):DIMVT(Q)
640 FOR N=1 TO Q:PRINT" STOCK NUMBER "N
641 INPUT" STOCK NAME";N$(N)
642 INPUT" CURRENT PRICE";PP(N)
643 INPUT" HIGHEST PRICE THIS YEAR";HP(N)
644 INPUT" LOWEST PRICE THIS YEAR";LP(N)
645 INPUT" ANNUAL DIVIDEND PER SHARE";PMT(N)
646 INPUT" ANNUAL EARNINGS PER SHARE";RE(N)
690 PRINT:GOSUB 800:NEXT
700 CLS:PRINT"COMPARATIVE STOCK ANALYSIS
720 PRINT"STOCK @      %-RETRN P/E-RATIO VOLATLTY
730 FOR N=1 TO Q:PRINT N$(N)
740 PRINT USING" ####,## ";PP(N),ROI(N),PE(N),VT(N):NEXT
780 INPUT"ENTER 1-REPLAY 9-EXIT";A
790 ON A GOTO 640,,,,,,,999
800 ROI(N)=(PMT(N)/PP(N))*100:PE(N)=PP(N)/RE(N):
VT(N)=100*(HP(N)-LP(N))/PP(N):RETURN
999 MENU
```

Portfolio File Summary

This program displays a summary of the records in the FOLIO.DO data file. Note that it does *not* calculate the percent yield of the investments. That value is calculated in the entry programs BONDS.BA, STOCK2.BA, ROIVAR, and ROIREG, or entered directly through the UPDATE.BA program.

Sample Run

```
PORTFOLIO SUMMARY -  
INVESTMENT  $INVST$  $WORTH$  %-YIELD  DATE  
  
B BOND1      $ 980      $ 1000      10 % 7/1/84  
S KIWI       $ 505      $ 531        1/1/84  
S QP DOLL    $ 511      $ 542        2/1/84  
PRESS ANY KEY TO CONTINUE?
```

This program concludes by displaying the FOLIO system menu, described at the end of this chapter.

Program Listing

If you are not going to save information about your investments in the FOLIO.DO file, simply skip this program, since it reads its information from that file.

```
100 REM SUMMRY,BA  
110 CLS:PRINT"PORTFOLIO SUMMARY - "DT$  
120 PRINT"INVESTMENT $INVST$ $WORTH$ %-YIELD DATE  
125 GOSUB 8000  
980 PRINT"PRESS ANY KEY TO CONTINUE"  
985 A$=INKEY$:IF A$=""THEN 985  
999 LOAD"FOLIO,BA",R  
1000 PRINT T$" "N$" "$PV" "$FV" "RA"% "D2$:RETURN  
8000 OPEN"FOLIO.DO"FOR INPUT AS 1  
8010 INPUT #1,T$,N$,PP,QTY,BC,PV,D1$,D2$,FV,RA,PMT,YR,PER  
8020 GOSUB 1000:IF EOF(1) THEN GOTO 8030 ELSE 8010  
8030 CLOSE:RETURN
```

Portfolio File Update — Add a New Record

You can use this next program when you want to add a new record to your FOLIO.DO data file. It calls on the first four programs described in this chapter to add a new bond, stock, or note; it also offers a way of adding a new investment manually (that is, without the aid of the automatic calculations in BONDS.BA, STOCK1.BA, and so on).

Sample Run

```
PORTFOLIO UPDATE - ADD A NEW NAME
IDENTIFY INVESTMENT TYPE
1-BOND
2-STOCK
3-NOTE - REGULAR FLOW
4-NOTE - IRREGULAR FLOW
5-OTHER
TYPE A NUMBER AND PRESS ENTER? 5
```

The first four options here use four programs described earlier in this chapter: BONDS, STOCK1, ROIREG, and ROIVAR. You must have already typed in those programs in order for this one to work. The last option, 5-OTHER, lets you enter data for any investment, following the pattern shown below. Under this option, all values must be entered manually — nothing is calculated for you.

For example, you might use this fifth option to enter a loan you're going to make to your sister-in-law to help her start a computer software business.

```
NAME OF INVESTMENT? WONDERWARE
PURCHASE PRICE (PER UNIT)? 2000
PURCHASE QUANTITY? 1
BROKER'S COMMISSION? 0
TOTAL INVESTMENT (INCL. COMM.)? 2000
PURCHASE DATE? 5/1/84
MATURITY OR LAST QUOTE DATE? 10/1/85
PRESS ANY KEY TO CONTINUE?
```

After completing the first screen, the program clears the screen and continues with five more prompts for data.

```
SALE VALUE? 2300
ANNUAL YIELD OR INTEREST? 10
PERIODIC INCOME PAYMENTS? 0
LENGTH OF TERM (YEARS)? 1.5
NUMBER OF PAYMENTS PER YEAR? 1
```

After the data has been entered, the screen clears and a summary of the entered information is shown for confirmation.

```
INVESTMENT DETAILS
NAME: WONDERWARE   TYPE: 0
PURCH. DATE:5/1/84 QUANTITY 1 @$ 2000
ORIG. INVESTMENT (INCL.COMM.):$ 2000
```


PERIODIC INCOME: \$ 0 - 1 TIMES/YR
MATURITY OR LAST QUOTE DATE:10/1/85
YIELD: 10 % P.A. NET ON SALE:\$ 300
ENTER 1-REPLAY 2-SAVE 9-EXIT? 2

Entering option 2-SAVE causes the entered data to be saved in the FOLIO.DO data file and returns a display of the FOLIO system menu.

Program Listing

If you are not going to save information about your investments, you can omit this program.

```
400 REM ADDREC.BA
410 CLS:PRINT"PORTFOLIO UPDATE - ADD A NEW NAME
420 PRINT" IDENTIFY INVESTMENT TYPE
430 PRINT" 1-BOND
440 PRINT" 2-STOCK
450 PRINT" 3-NOTE - REGULAR FLOW
460 PRINT" 4-NOTE - IRREGULAR FLOW
470 PRINT" 5-OTHER
480 INPUT"TYPE A NUMBER AND PRESS ENTER";A
490 ON A GOTO 491,492,493,494,495,,,999
491 LOAD"BONDS.BA",R
492 LOAD"STOCK1.BA",R
493 LOAD"ROIREG.BA",R
494 LOAD"ROIVAR.BA",R
495 GOTO 510
510 CLS:INPUT" NAME OF INVESTMENT";N$
520 INPUT" PURCHASE PRICE (PER UNIT)";PP
530 INPUT" PURCHASE QUANTITY";QTY
540 INPUT" BROKER'S COMMISSION";BC
550 INPUT" TOTAL INVESTMENT (INCL. COMM.)";PV
560 INPUT" PURCHASE DATE";D1$
570 INPUT" MATURITY OR LAST QUOTE DATE:";D2$
580 PRINT"PRESS ANY KEY TO CONTINUE";A$
585 A$=INKEY$:IF A$=""THEN 585
610 CLS:INPUT" SALE VALUE";FV
620 INPUT" ANNUAL YIELD OR INTEREST";RA
630 INPUT" PERIODIC INCOME PAYMENTS";PMT
640 INPUT" LENGTH OF TERM (YEARS)";YR
650 INPUT" NUMBER OF PAYMENTS PER YEAR";PER
710 T$="0":GOSUB 6000
890 INPUT"ENTER 1-REPLAY 2-SAVE 9-EXIT";A:ON A GOTO 410,9000,,,,,999
999 LOAD"FOLIO.BA",R
6000 CLS:PRINT"INVESTMENT DETAILS
6020 PRINT" NAME: "N$" TYPE: "T$
```

```

6030 PRINT" PURCH, DATE:"D1$" QUANTITY"QTY"@ $"PP
6040 PRINT" ORIG, INVESTMENT (INCL,COMM.): $"PV
6050 PRINT" PERIODIC INCOME: $"PMT" - "PER"TIMES/YR
6060 PRINT" MATURITY OR LAST QUOTE DATE "D2$
6070 PRINT" YIELD:"RA"% P.A, NET ON SALE: $"FV-PV
6080 RETURN
9000 OPEN"RAM:FOLIO.DO"FOR APPEND AS 1
9010 PRINT #1,T$,"N$","PP","QTY","BC","PV","D1$","D2$","FV","RA",
"PMT","YR","PER:CLOSE:LOAD"FOLIO,BA",R

```

Portfolio File Maintenance — View and Update Records

You can use this program to view and update the information stored for each investment in your FOLIO.DO data file.

Sample Run

```

PORTFOLIO LISTING
INVESTMENT DETAILS
NAME: KIWI  TYPE: S
PURCH, DATE:1/1/84 QUANTITY: 25 @ $ 20
ORIG, INVESTMENT (INCL,COMM.): $505
PERIOD, INCOME: $ 50 - 1 TIMES/YR
MATURITY OR LAST QUOTE DATE:
YIELD: 0 % P.A, NET ON SALE: $ 0
ENTER 1-UPDATE THIS RECORD 2-NEXT? 1

```

By selecting option 2-NEXT, you can display details of the next record in this file. By selecting option 1-UPDATE, as we have in this example, you can change any of the information in this record. Simply press without typing any other keys at each spot where the old value has not changed.

```

NAME OF INVESTMENT: KIWI
OLD PURCHASE PRICE (PER UNIT): 19.25
NEW PURCHASE PRICE (PER UNIT)? 
OLD PURCHASE QUANTITY: 25
NEW PURCHASE QUANTITY? 
OLD BROKER'S COMMISSION: 18.25
NEW BROKER'S COMMISSION? 
OLD TOTAL INVESTMENT (INCL, COMM.): 505
NEW TOTAL INVESTMENT (INCL, COMM.)? 
OLD PURCHASE DATE: 1/1/84
NEW PURCHASE DATE? 

```



```

OLD MATURITY OR LAST QUOTE DATE: 
NEW MATURITY OR LAST QUOTE DATE? 2/1/84
LAST SALE VALUE: 0
NEW SALE VALUE? 550 
OLD ANNUAL YIELD OR INTEREST: 0
NEW ANNUAL YIELD OR INTEREST? 10 
OLD PERIODIC INCOME PAYMENTS: 50
NEW PERIODIC INCOME PAYMENTS? 
OLD LENGTH OF TERM (YEARS):
NEW LENGTH OF TERM (YEARS)? 
OLD NUMBER OF PAYMENTS PER YEAR: 1
NEW NUMBER OF PAYMENTS PER YEAR? 

```

Completion of these entries results in the new information being added in the FOLIO.DO data file, after which the FOLIO system menu is displayed.

Program Listing

Notice that this program adds the updated information as a new record to the end of the FOLIO.DO data file. It leaves the old information as a separate record in the file; you can delete it, using the next program in this chapter, or you can leave it as a historical trail. If you are not going to save information about your investments, skip this program.

```

200 REM UPDATE.BA
210 CLS:PRINT"PORTFOLIO LISTING
220 GOSUB 8000
980 PRINT"PRESS ANY KEY TO CONTINUE"
985 A$=INKEY$:IF A$=""THEN 985
999 LOAD"FOLIO.BA",R
2000 CLS
2510 PRINT" NAME OF INVESTMENT:";N$
2520 PRINT" OLD PURCHASE PRICE (PER UNIT):";PP
2530 INPUT" NEW PURCHASE PRICE (PER UNIT)";PP
2540 PRINT" OLD PURCHASE QUANTITY:";QTY
2550 INPUT" NEW PURCHASE QUANTITY";QTY
2560 PRINT" OLD BROKER'S COMMISSION:";BC
2565 INPUT" NEW BROKER'S COMMISSION";BC
2570 PRINT" OLD TOTAL INVESTMENT (INCL. COMM.):";PV
2580 INPUT" NEW TOTAL INVESTMENT (INCL. COMM.)";PV
2590 PRINT" OLD PURCHASE DATE:";D1$
2600 INPUT" NEW PURCHASE DATE";D1$
2610 PRINT" OLD MATURITY OR LAST QUOTE DATE:";D2$
2615 INPUT" NEW MATURITY OR LAST QUOTE DATE";D2$
2620 PRINT" LAST SALE VALUE:";FV
2630 INPUT" NEW SALE VALUE";FV

```

```

2640 PRINT" OLD ANNUAL YIELD OR INTEREST:";RA
2650 INPUT" NEW ANNUAL YIELD OR INTEREST";RA
2660 PRINT" OLD PERIODIC INCOME PAYMENTS:";PMT
2670 INPUT" NEW PERIODIC INCOME PAYMENTS";PMT
2680 PRINT" OLD LENGTH OF TERM (YEARS):";YR
2690 INPUT" NEW LENGTH OF TERM (YEARS)";YR
2700 PRINT" OLD NUMBER OF PAYMENTS PER YEAR:";PER
2710 INPUT" NEW NUMBER OF PAYMENTS PER YEAR";PER
2720 GOTO 9000
6000 CLS:PRINT"INVESTMENT DETAILS
6020 PRINT" NAME: "N$" TYPE: "T$
6030 PRINT" PURCH. DATE:"D1$" QUANTITY "QTY"@$ "PP
6040 PRINT" ORIG. INVESTMENT (INCL.COMM.):$"PV
6050 PRINT" PERIOD. INCOME:$"PMT"-"PER" TIMES/YR
6060 PRINT" MATURITY OR LAST QUOTE DATE:"D2$
6070 PRINT"YIELD:"RA"% P.A. NET ON SALE:$"FV-PV
6080 INPUT"ENTER 1-UPDATE THIS RECORD 2-NEXT";A
6090 ON A GOTO 2000,8020
8000 OPEN"RAM:FOLIO.DO"FOR INPUT AS 1:N=0
8010 INPUT #1,T$,N$,PP,QTY,BC,PV,D1$,D2$,FV,RA,PMT,YR,PER:GOSUB 6000
8020 IF EOF(1) THEN GOTO 8030 ELSE GOTO 8010
8030 CLOSE:RETURN
9000 OPEN"RAM:FOLIO.DO"FOR APPEND AS 1
9010 PRINT #1,T$,"N$","PP","QTY","BC","PV","D1$","
"D2$","FV","RA","PMT","YR","PER:CLOSE:GOTO 999

```

Investment Portfolio Maintenance — Delete a Record

If you have been deleting records of stocks updated or sold by simply entering the FOLIO.DO text file and using normal text editing techniques to delete lines that are no longer applicable, you will find that this next program simplifies these deletions.

Sample Run

The program begins by listing the current records in the FOLIO.DO investment data file.

```

PORTFOLIO FILE MAINTENANCE
  SELECT RECORD TO BE DELETED
1 B BOND1 980 1000 7/1/84
2 S KIWI 505 1/1/84
3 S QP DOL511 542 2/1/84
4 S KIWI 505 550 2/1/84
PRESS CTL-C TO EXIT, OR
ENTER NUMBER OF RECORD TO DELETE? 2
PRESS ANY KEY TO CONTINUE?

```


Since record number 4 is an updated version of record number 2, you might want to delete record number 2, as shown above. This program updates the FOLIO.DO data file and returns to the FOLIO system menu. (Note: If you are going to always have less than 11 records in FOLIO.DO, you can omit line 100. Line 100 allows up to 25 records. For longer files, increase the number in parentheses: for example, for a file of up to 40 records, replace the 25\$ in line 100 with 40\$. If you make the number too large, you'll receive an OM [out of memory] error when you run the program, and you'll have to reduce the number or delete line 100.)

Program Listing

```

90  REM DELETE,BA
100 DIM T$(25),N$(25),PP(25),QTY(25),BC(25),PV(25),D1$(25),D2$(25),
FV(25),RA(25),PMT(25),YR(25),PER(25)
110 CLS:PRINT"PORTFOLIO FILE MAINTENANCE
120 PRINT"  SELECT RECORD TO BE DELETED
130 GOSUB 8000
170 PRINT"PRESS CTL-C TO EXIT, OR
180 INPUT"ENTER NUMBER OF RECORD TO DELETE";A
190 KILL"RAM:FOLIO.DO"
195 FOR I=1 TO A-1:GOSUB 9000:NEXT
200 FOR I=A-1 TO N:GOSUB 9000:NEXT
290 PRINT"PRESS ANY KEY TO CONTINUE"
295 A$=INKEY$:IF A$=""THEN 295
999 LOAD"FOLIO,BA",R
5000 PRINT N T$ N$ PV FV D2$:RETURN
8000 OPEN"RAM:FOLIO.DO"FOR INPUT AS 1:N=0
8010 N=N+1:INPUT #1,T$(N),N$(N),PP(N),QTY(N),BC(N),PV(N),D1$(N),
D2$(N),FV(N),RA(N),PMT(N),YR(N),PER(N):GOSUB 5000
8020 IF EOF(1) THEN GOTO 8030 ELSE GOTO 8010
8030 CLOSE:RETURN
9000 OPEN"RAM:FOLIO.DO"FOR APPEND AS 1
9010 PRINT #1,T$(N),"N$(N)","PP(N)","QTY(N)","BC(N)","PV(N)","D1$(N),
"D2$(N)","FV(N)","RA(N)","PMT(N)","YR(N)","PER(N):CLOSE:GOTO 999

```

Investment Portfolio Menu Program

The FOLIO system menu program is an optional but convenient way of tying the programs in this chapter together. You can adapt it to use only those programs that you decide to type in.

Sample Run

```
SELECT PORTFOLIO MANAGEMENT OPTION
1-DISPLAY SUMMARY
2-DISPLAY DETAILS
3-UPDATE CURRENT DATA
4-ADD A NEW INVESTMENT
5-DELETE AN INVESTMENT
9-EXIT
TYPE A NUMBER AND PRESS ENTER? 9
```

Program Listing

```
10 REM FOLIO.BA
11 CLS:PRINT"SELECT PORTFOLIO MANAGEMENT OPTION
12 PRINT" 1-DISPLAY SUMMARY
13 PRINT" 2-DISPLAY DETAILS
14 PRINT" 3-UPDATE CURRENT DATA
15 PRINT" 4-ADD A NEW INVESTMENT
16 PRINT" 5-DELETE AN INVESTMENT
17 PRINT" 9-EXIT
18 INPUT"TYPE A NUMBER AND PRESS ENTER";A
19 ON A GOTO 100,200,300,400,500,,,999
100 LOAD"SUMMARY.BA",R
200 LOAD"UPDATE.BA",R
300 LOAD"UPDATE.BA",R
400 LOAD"ADDREC.BA",R
500 LOAD"DELETE.BA",R
999 MENU
```

Now that you've got all the programs typed in, your portable stock-broker is ready to serve you. We're bullish on your chances for making a killing in the market!

7

Production Analysis

Production Analysis Programs

- A Gantt chart
- Profit margin
- Economic order quantity
- Depreciation analysis
- Break-even analysis
- Inventory tally

A manufacturing business — a business that makes a physical product — presents its own special problems, whether it is a large factory that produces thousands of items a day or a craft shop or artist's studio where production of each piece takes days, weeks, or even longer. Whatever the size of the business or the nature of the product, the business owner is likely to need to answer questions related to *production analysis*. The programs in this chapter can help you answer these kinds of questions. If you have a manufacturing business, we think you'll find them useful in dealing with a number of issues that are likely to arise in your work almost every day.

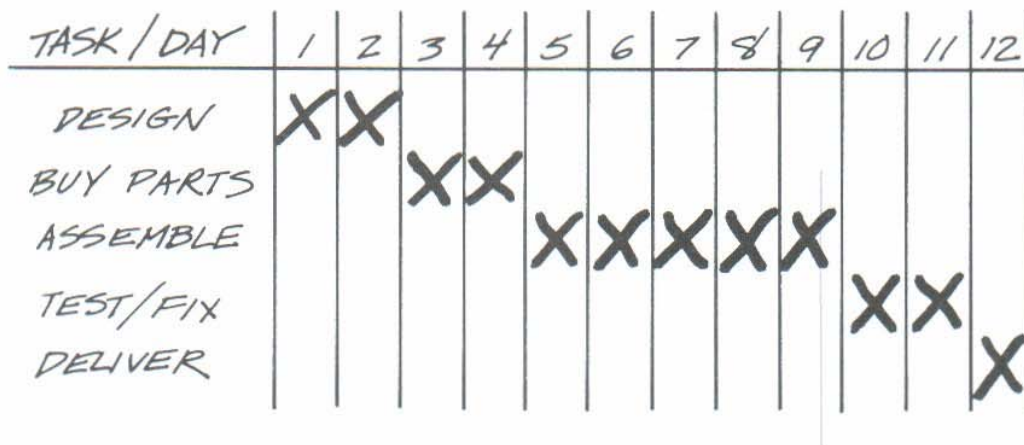
You can use the first program here, GANTT.BA, to sketch out the time relationships for a series of interdependent tasks. You can use the profit margin program, MARGIN.BA, to calculate what retail price various products will demand, based on the standard profit margin in your industry and your manufacturing costs.

The last three programs in this chapter will be of special interest to anyone who has purchased equipment or who maintains inventories of finished goods or supplies. Three ways of calculating depreciation on equipment are offered by the program DEPREC.BA. The ORDQTY.BA program calculates how many units of an inventoried item should be ordered and how many times a year to place the order. The last program in

this chapter, INVENT.BA, maintains an inventory data file, INVDTA.DO, where each record shows a product name, quantity, and unit price.

A Gantt Chart

Owners of well-organized manufacturing businesses like to plan projects by estimating how long each step will take, granting that some steps cannot begin until others are completed. This lets the manufacturer determine the probable delivery date of a new product line. You can do this planning on a kind of graph called a Gantt chart. A typical Gantt chart is shown below.



Our first program makes your Model 100 generate a Gantt chart for you.

Sample Run

The GANTT.BA program begins by prompting for information about five tasks, including task identification, starting day, and duration in days.

GANTT CHART FOR 5 TASKS IN 30 DAYS

TASK 1

TASK ID? DESIGN

STARTING DAY #? 1

DURATION OF TASK, IN DAYS? 2

GANTT CHART FOR 5 TASKS IN 30 DAYS

TASK 2

TASK ID? BUY PARTS

STARTING DAY #? 3

DURATION OF TASK, IN DAYS? 2

GANTT CHART FOR 5 TASKS IN 30 DAYS
TASK 3

TASK ID? ASSEMBLE
STARTING DAY #? 5
DURATION OF TASK, IN DAYS? 5

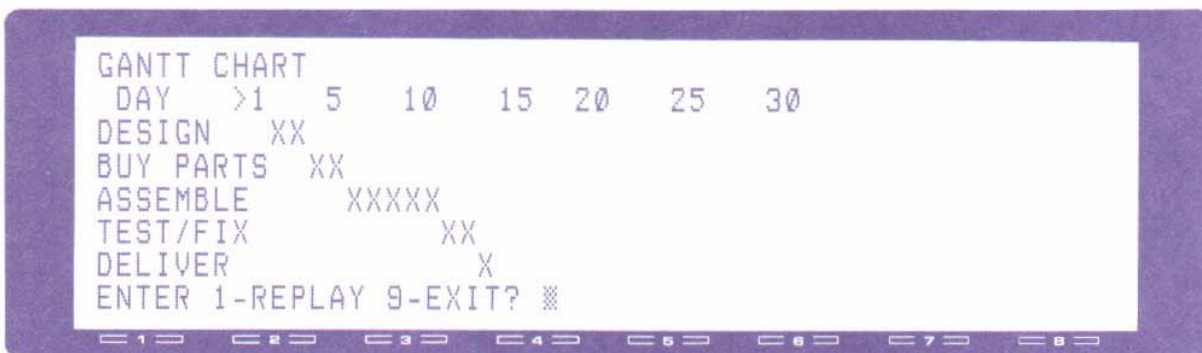
GANTT CHART FOR 5 TASKS IN 30 DAYS
TASK 4

TASK ID? TEST/FIX
STARTING DAY #? 10
DURATION OF TASK, IN DAYS? 2

GANTT CHART FOR 5 TASKS IN 30 DAYS
TASK 5

TASK ID? DELIVER
STARTING DAY #? 12
DURATION OF TASK, IN DAYS? 1

The program converts the entered information into a graphic display. This program is adapted from the bar chart program described in Chapter 2.



In the version shown above, the bars are built out of (SHIFT)X's (uppercase x's) so the bar chart can be printed on any printer. Another version of the program builds the bars using the special character created by (SHIFT)(GRPH)X. This creates nice-looking solid bars on the screen, but they cannot be interpreted by most printers.

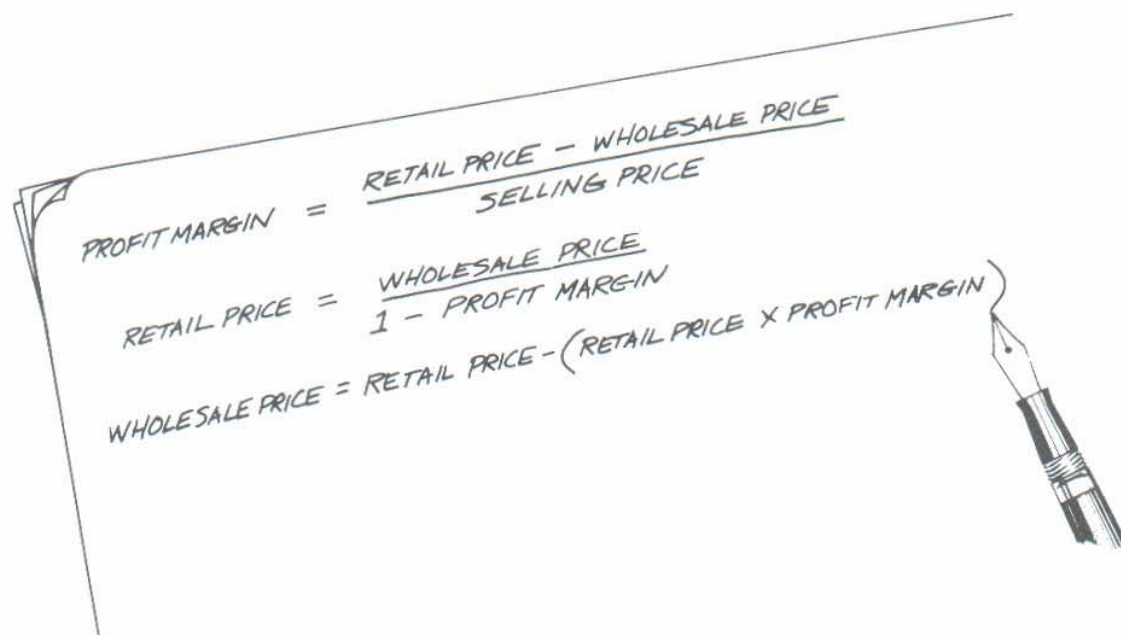
Program Listing

```
10 REM GANTT,BA
20 DEFINT A-Z:BV(0)=0:X=1
30 FOR I=1 TO 5
40 CLS:PRINT"GANTT CHART FOR 5 TASKS IN 30 DAYS"
50 PRINT USING"TASK #";I
60 PRINT:INPUT" TASK ID";BT$(I)
70 INPUT" STARTING DAY #";SD(I)
80 INPUT" DURATION OF TASK, IN DAYS";DT(I)
90 IF DT(I)+SD(I)>30 THEN GOTO 888 ELSE NEXT
100 CLS:PRINT"GANTT CHART"
110 PRINT" DAY    >1    5    10    15    20    25    30"
120 FOR I=1 TO 5:PRINT@((I+1)*40),BT$(I):NEXT
130 FOR I=1 TO 5
140 FOR K=1 TO DT(I):PRINT@((I+1)*40+7+SD(I)+K),"X":NEXT K
150 NEXT I
180 INPUT"ENTER 1-REPLAY 9-EXIT";A
190 ON A GOTO 10,,,,,,,,,999
888 PRINT"TIME EXCEEDS 30 DAYS":GOTO 20
999 MENU
```

Profit Margin

If you are a manufacturer, you know that you must keep production costs low enough to meet dealers' expectations for profit and buyers' expectations for a fair price. In the furniture business, for example, the typical retailer operates with a profit margin of 60 percent. In other words, the furniture dealer will pay about \$40 for a chair he can sell for \$100, on the average.

Suppose that, as a furniture manufacturer, you find that it will cost you \$10 to make a certain chair in oak, or \$5 in pine. This particular chair design will cost about \$20 in labor to assemble. Thus your total costs are \$25 for the pine, \$30 for the oak. Most dealers will add a 60 percent markup. If you make your profit margin calculations by hand, they might look something like this:



Alternatively — and more quickly — you can get your Model 100 to figure the same thing with this program, MARGIN.BA.

Sample Run

You can press **(F4)** to test your typed lines in BASIC.

```

PROFIT MARGIN ANALYSIS
WHOLESALE PRICE? 30
RETAIL PRICE? 50
PROFIT MARGIN = 40.00 %
ENTER 1-REPLAY OR 9-RETURN TO MENU? 1

```

You can see that if the retailers charge \$50 for an oak chair they buy from you for \$30, they'll be getting only a 40 percent profit margin — not enough.

Bearing in mind that a 60 percent profit margin is typical in the furniture business, you may wonder how much dealers would have to sell your chair for to make that profit margin. Our program can answer that question, too. This time, when the program asks for retail price, you simply press **(ENTER)** without making an entry. Then a new question will appear: PROFIT MARGIN %?

```

PROFIT MARGIN ANALYSIS
WHOLESALE PRICE? 30
RETAIL PRICE? (ENTER)
PROFIT MARGIN%? 60
RETAIL PRICE = $ 75.00
ENTER 1-REPLAY OR 9-RETURN TO MENU? 1

```

You can use this program to look at the chair question in still another way. It can tell you, for example, how much you have to sell your chair for so that the dealers can sell it for \$50 and make 60 percent profit.

```

PROFIT MARGIN ANALYSIS
WHOLESALE PRICE? 
RETAIL PRICE? 50
PROFIT MARGIN? 60
RETAIL PRICE = $      20.00
ENTER 1-REPLAY OR 9-RETURN TO MENU? 9

```

Since a dealer would have to buy the chair from you at less than cost in order to sell it for \$50 and make an appropriate profit, it's clear that this price isn't feasible. You'll have to confine your marketing to the better furniture stores, where consumers expect higher prices to be charged.

Program Listing

```

10 REM MARGIN.BA
20 CLS:PRINT"PROFIT MARGIN ANALYSIS
30 WP=0:INPUT"WHOLESALE PRICE";WP
40 RP=0:INPUT"RETAIL PRICE";RP
50 IF RP=0 OR WP=0 THEN 80 ELSE 60
60 PM=(RP-WP)/RP*100
70 PRINT USING"PROFIT MARGIN = ###,## %";PM:GOTO 180
80 PM=0:INPUT"PROFIT MARGIN (%)";PM:IF WP=0 THEN 110 ELSE 90
90 RP=WP/(1-PM/100)
100 PRINT USING"RETAIL PRICE = #####,##";RP:GOTO 180
110 WP=RP-(RP*PM/100)
120 PRINT USING"WHOLESALE PRICE = #####,##";WP
180 INPUT"ENTER 1-REPLAY OR 9-RETURN TO MENU";A
190 ON A GOTO 20,,,,,,999
999 MENU

```

Depreciation

Suppose that, as a furniture manufacturer, you decide you need to buy a table saw and drill press. On your balance sheet, the expense of the purchase (less cash in the bank) is balanced by the value of your "fixed assets"; that is, the price you pay for the equipment is reported as a value added to your net worth. Equipment is considered an asset because you can resell it later.

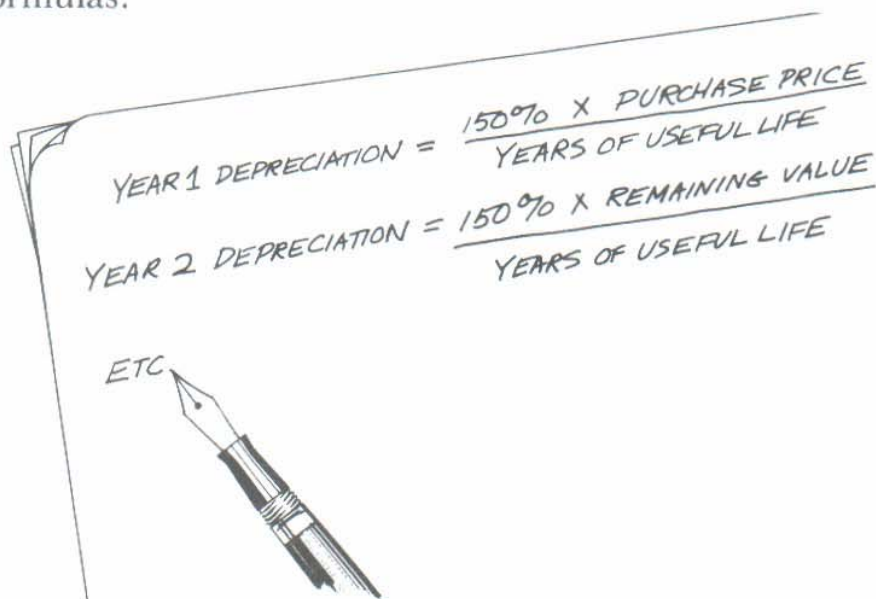
Of course, the value of equipment falls over time as its condition deteriorates and newer models make it obsolete. To account for the declining value of assets, a "depreciation" amount is deducted from the total asset value each year. This depreciation value is also deducted as an expense in tax accounting (you *cannot* deduct the full purchase price of equipment all at once, in most cases).

The three most common methods of calculating depreciation are included in our DEPREC.BA program. Straight-line depreciation is the simplest. In this method, the cost of the equipment is divided evenly over the equipment's useful life.

The straight-line method, however, can yield a misleading assessment of the "current value" of the equipment. A more realistic approach is to include an "acceleration" factor to show that the biggest drop in book value occurs in the first year. Accountants have developed two formulas that produce a gradual drop in the annual depreciation assessed over the useful life of equipment: the sum-of-the-years'-digits method and the declining-balance method. These accelerated depreciation methods are usually considered favorable for tax purposes, since they allow larger deductions in early years.

The sum-of-the-years'-digits method works this way: If the useful life of the asset is three years, then the sum of the years' digits is $3 + 2 + 1 = 6$. During the first year of use, depreciation will be taken as 3/6ths ($1/2$) of the asset's purchase price. During the second year, depreciation will be 2/6ths ($1/3$); during the third year, 1/6th.

The declining-balance method uses an assumed acceleration factor. For example, if the acceleration factor is 150 percent, then the depreciation taken in the first year and in subsequent years will be calculated by these formulas:



A hand-drawn diagram of a notepad with two lines of text and a pen. The first line is "YEAR 1 DEPRECIATION = $\frac{150\% \times \text{PURCHASE PRICE}}{\text{YEARS OF USEFUL LIFE}}$ ". The second line is "YEAR 2 DEPRECIATION = $\frac{150\% \times \text{REMAINING VALUE}}{\text{YEARS OF USEFUL LIFE}}$ ". Below the second line is the word "ETC" and a drawing of a fountain pen.

$$\text{YEAR 1 DEPRECIATION} = \frac{150\% \times \text{PURCHASE PRICE}}{\text{YEARS OF USEFUL LIFE}}$$
$$\text{YEAR 2 DEPRECIATION} = \frac{150\% \times \text{REMAINING VALUE}}{\text{YEARS OF USEFUL LIFE}}$$

ETC

Sample Run

The three methods of depreciation calculation offered by the DEPREC.BA program are displayed as a menu on the opening screen, as shown below. We'll look at each method in turn.

DEPRECIATION ANALYSIS

- 1-STRAIGHT-LINE METHOD
- 2-SUM-OF-YEARS-DIGITS METHOD
- 3-DECLINING-BALANCE METHOD

TYPE A NUMBER AND PRESS ENTER? 1

The straight-line method requires three items of input: the purchase price, the expected "useful" life, and the final salvage value. The final salvage value is the sale price of the used equipment at the end of its useful life. In this case, let's say you figure you could sell your furniture-making equipment to someone for \$1,000 after five years.

DEPRECIATION ANALYSIS

PRESENT VALUE? 5000
USEFUL LIFE (YEARS)? 5
FINAL (SALVAGE) VALUE? 1000

As you can see, the result with this method is a stream of equal values over the life of the equipment.

YEAR	DEPRECIATION	VALUE REMAINING
1	800.00	4,200.00
2	800.00	3,400.00
3	800.00	2,600.00
4	800.00	1,800.00
5	800.00	1,000.00

ENTER 1-REPLAY OR 9-EXIT? 1

Entering 1-REPLAY returns you to the menu of depreciation analysis methods. This time let's choose option 2, the sum-of-the-years'-digit method. This method calls for the same three items of information as the straight-line method. If you enter the same values as above, it will show the depreciation value decreasing each year.

YEAR	DEPRECIATION	VALUE REMAINING
1	1,333.33	3,666.67
2	1,066.67	2,600.00
3	800.00	1,800.00
4	533.33	1,266.67
5	266.67	1,000.00

ENTER 1-REPLAY OR 9-EXIT? 1

Again, let's return to the DEPREC.BA menu of choices and this time pick option 3, the declining-balance method. Notice that now one prompt changes: the acceleration factor, not the final salvage value, is requested. The program will calculate the final salvage value.

DEPRECIATION ANALYSIS

PRESENT VALUE? 5000
 USEFUL LIFE (YEARS)? 5
 ACCELERATION FACTOR? 150

YEAR	DEPRECIATION	VALUE REMAINING
1	1,500.00	3,500.00
2	1,050.00	2,450.00
3	735.00	1,715.00
4	514.50	1,200.50
5	360.15	840.35

ENTER 1-REPLAY OR 9-EXIT? 9

Entering 9-EXIT returns you to the main menu on the Model 100.

Program Listing

```

10 REM DEPREC.BA
11 DEFDBL A-Z:CLS:PRINT"DEPRECIATION ANALYSIS"
21 PRINT:PRINT"  1-STRAIGHT-LINE METHOD"
41 PRINT"  2-SUM-OF-YEARS-DIGITS METHOD"
51 PRINT"  3-DECLINING-BALANCE METHOD"
61 PRINT:INPUT"TYPE A NUMBER AND PRESS ENTER";A
91 ON A GOTO 100,200,300;
100 REM STRAIGHT-LINE
101 GOSUB 1000:GOSUB 2000:GOSUB 7000
121 FOR N=1 TO YR:D(N)=(PV-FV)/YR
131 GOSUB 8000:NEXT:GOTO 9000

```

```

200 REM SUM-OF-DIGITS
201 GOSUB 1000:GOSUB 2000:GOSUB 7000
211 FOR N=1 TO YR:D(N)=(PV-FV)*(YR+1-N)/(YR*(YR+1)/2)
221 GOSUB 8000:NEXT:GOTO 9000
300 REM DECLINING BALANCE
301 GOSUB 1000:GOSUB 3000:GOSUB 7000
311 FOR N=1 TO YR:D(N)=(VR*AF)/100/YR
321 GOSUB 8000:NEXT:GOTO 9000
1000 CLS:PRINT"DEPRECIATION ANALYSIS"
1011 PRINT:INPUT" PRESENT VALUE";PV:VR=Pv
1031 INPUT" USEFUL LIFE (YEARS)";YR
1041 RETURN
2000 INPUT" FINAL (SALVAGE) VALUE";FV:RETURN
3000 INPUT" ACCELERATION FACTOR";AF:RETURN
7000 CLS:PRINT" YEAR   DEPRECIATION   VALUE REMAINING":RETURN
8000 VR=VR-D(N)
8010 PRINT TAB(6);N;TAB(2);
8011 PRINT USING "#####,.##";D(N),VR
8020 RETURN
9000 INPUT"ENTER 1-REPLAY OR 9-EXIT";A
9001 ON A GOTO 10,9999
9999 MENU

```

Economic Order Quantity

How much inventory should you keep on hand? — As much as will fit in the warehouse? As much as your cash and credit can buy? This might be the way to go if there's a heavy demand for your product and your cost per item is going up faster than the sale value. On the other hand, if demand is fairly predictable, if your warehouse space is limited, or if you have better uses for your cash than to let it sit on your shelves, then you might be interested in knowing what your *economic order quantity* is.

The economic order quantity is the optimum quantity to be ordered each time an order is placed. To calculate this value, you need to know how much it costs to place an order (shipping and handling) and how many units you sell annually. In addition, inventory carrying costs are given as a percentage of inventory value. Usually they equal the interest rate your funds would earn if they were not tied up in inventory. Finally, you need to

specify the wholesale price of the item — that is, your cost of purchase or manufacture. Our program for determining economic order quantity uses these variables:

Economic Order Quantity Values

EOQ	= Economic order quantity
OC	= Fixed cost of placing and receiving an order
SQ	= Annual sales in units
IC	= Inventory carrying cost, a percentage of inventory value
WP	= Wholesale price, purchase price per unit

The program calculates the following values from the variables:

$$EOQ = \sqrt{2 \times OC \times SQ / IC \times WP}$$

$$IC \times WP = \text{unit carrying cost}$$

$$SQ / EOQ = \text{number of orders needed to be placed each year}$$

$$EOQ / 2 + \text{safety stock} = \text{average inventory}$$

For easy reference, here's the Economic Order Quantity formula written out:

$$\text{ECONOMIC ORDER} = \sqrt{\frac{2 \times \text{COST OF PLACING ORDER} \times \text{ANNUAL SALES VOLUME}}{\text{INVENTORY CARRYING FACTOR} \times \text{WHOLESALE PRICE}}}$$

These formulas assume that sales are distributed evenly over time and that delivery time is the same throughout the year. No adjustment is made for major seasonal variations. Safety stock is a “cushion” added in businesses where the penalties for running out of stock are high, as when disappointed customers would change to another supplier.

Sample Run

Suppose you decided to calculate the economic order quantity for number 5 brass screws. You know it costs you \$10 to place an order with your hardware dealer. Based on sales of 5,000 chairs per year, you decide you will need 300 boxes of brass screws, which you can buy for \$1.25 per box. Let's assume inventory carrying costs to be 10% of inventory value — about the best interest rate your money could earn in savings. Therefore you might answer the program's prompts this way:

```
ECONOMIC ORDER QUANTITY
FIXED COST OF PLACING AN ORDER? 10
ANNUAL SALES (UNITS)? 300
INVENTORY CARRYING COST (%)? 10
WHOLESALE OR MFR COST PER UNIT? 1.25
ECONOMIC ORDER QUANTITY = 27
# OF ORDERS PER YEAR = 10
AVG. INVENTORY = 13
(PPLUS SAFETY STOCK)  PRESS ANY KEY?
```

Using these figures, the program tells you that you should order 27 boxes of brass screws at a time, ten times a year. The average inventory over time will be 13 boxes of screws — a measure you could use to allot shelf space.

Program Listing

```
10 REM ORDQTY,BA
20 DEFDBL A-Z:CLS:PRINT"ECONOMIC ORDER QUANTITY
30 INPUT" FIXED COST OF PLACING AN ORDER";OC
40 INPUT" ANNUAL SALES (UNITS)";SQ
50 INPUT" INVENTORY CARRYING COST (%)";IC
60 INPUT" WHOLESALE OR MFR COST PER UNIT";WP
70 OQ=SQR((2*OC*SQ)/IC*WP)
80 PRINT "ECONOMIC ORDER QUANTITY ="INT(OQ)
90 PRINT"# OF ORDERS PER YEAR ="INT(SQ/OQ)
100 PRINT"AVG. INVENTORY ="INT(OQ/2)
110 PRINT" (PLUS SAFETY STOCK)  PRESS ANY KEY";
120 A$=INKEY$:IF A$=""THEN 120
999 MENU
```


Inventory Records

Inventory records are vital for tax reporting, statements to stockholders, and business management records. Our last production analysis program tracks inventory totals for any number of inventoried items and stores them in a data file named INVDTA.DO. The inventory summary produced by this program will tell you the name of each item, the number on hand, the unit value, the date the count was taken, and the total dollar value of the stock.

Sample Run

The INVENT.BA program opens by offering four menu choices:

```
INVENTORY UPDATE AND REVIEW
1-UPDATE EXISTING INVENTORY
2-ADD NEW ITEM TO INVENTORY
3-DISPLAY SUMMARY
9-EXIT
ENTER SELECTION NUMBER? 2
```

If you haven't entered any data yet, your first choice might well be to add a new item to inventory. Four items of information are stored for each inventory item: product name, on-hand quantity, cost per unit, and date counted.

```
ADD A NEW PRODUCT TO INVENTORY
```

```
PRODUCT NAME? LEG CAPS
STARTING QUANTITY? 5000
UNIT VALUE? 1
DATE? 1/1/84
PRESS ANY KEY TO CONTINUE?
```

After accepting your entry, the program updates the INVDTA.DO file and returns you to the basic selection of inventory options. Let's say you enter three more inventory items, then ask for a summary — option 3 on the program's menu. This is what you might get:

```
INVENTORY SUMMARY
ITEM      QTY  $UNIT$  DATE    VALUE
LEG CAPS  5000  1       1/1/84  5000
BRASS SCR 10000  1       1/1/84  10000
CHAIR ARM 7000   5       1/1/84  35000
SEAT COVE 3000   3       1/1/84  9000
PRESS ANY KEY TO CONTINUE?
```

Again, after displaying the inventory summary, the program returns to the inventory options menu. Now that you have some stored records, you can select the option of updating the existing records (option 1). Such a selection might produce this list:

```
INVENTORY UPDATE
SELECT FROM PRODUCT LIST:
 1 -LEG CAPS
 2 -BRASS SCREWS
 3 -CHAIR ARMS
 4 -SEAT COVERS
ENTER SELECTION NUMBER? 1
```

Suppose you select item number 1 for update.

```
UPDATE ITEM # 1 -LEG CAPS
LAST TOTAL & DATE = 5000 ON 1/1/84

REVISED TOTAL QUANTITY? 4000
UNIT VALUE? 1
DATE? 2/1/84
PRESS ANY KEY TO CONTINUE?
```

A short trilling sound indicates that the inventory file INVDTA.DO has been updated with the new information. The new information will be reflected in the summary.

At this point, the INVDTA.DO file in our example holds four records, in this format:

```
LEG CAPS, 4000 , 1 , 2/1/84<
BRASS SCREWS, 10000 , 1 , 1/1/84<
CHAIR ARMS, 7000 , 5 , 1/1/84<
SEAT COVERS, 3000 , 3 , 1/1/84<
```

Information about each item in the inventory file is listed on a line of its own, and each item of information is separated from the others by commas. Each entry takes up about 30 bytes — one byte for each character, including spaces and carriage returns (<). If your inventory will have less than 11 different items, you can omit line 12. Change the number in parentheses if you will have more than 20 items.

Program Listing

```
10 REM INVENT.BA
11 DEFINT A-Z
12 DIM N$(20),Q(20),WP(20),DT$(20)
21 CLS:PRINT"INVENTORY UPDATE AND REVIEW
31 PRINT" 1-UPDATE EXISTING INVENTORY
41 PRINT" 2-ADD NEW ITEM TO INVENTORY
51 PRINT" 3-DISPLAY SUMMARY
71 PRINT" 9-EXIT
81 INPUT"ENTER SELECTION NUMBER";A:ON A GOTO 100,200,300,,,,,999
100 CLS:PRINT"INVENTORY UPDATE":GOSUB 1000
120 PRINT"SELECT FROM PRODUCT LIST:"
130 FOR I=1 TO K:PRINT I;"-N$(I):NEXT
140 INPUT"ENTER SELECTION NUMBER";I
150 CLS:PRINT"UPDATE ITEM #"I;"-N$(I)
160 PRINT"LAST TOTAL & DATE ="Q(I)"ON "DT$(I)
170 PRINT:INPUT"REVISED TOTAL QUANTITY";Q(I)
180 INPUT"UNIT VALUE";WP(I)
190 INPUT"DATE";DT$(I):GOSUB 2000
195 PRINT"PRESS ANY KEY TO CONTINUE";
197 A$=INKEY$:IF A$=""THEN 197
198 GOTO 21
200 CLS:PRINT"ADD A NEW PRODUCT TO INVENTORY"
220 PRINT:INPUT"PRODUCT NAME";N$
230 INPUT"STARTING QUANTITY";Q
240 INPUT"UNIT VALUE";WP
250 INPUT"DATE";DT$
260 OPEN"RAM:INVDTA.DO"FOR APPEND AS 1
270 PRINT #1,N$,"Q","WP","DT$:CLOSE
280 PRINT"PRESS ANY KEY TO CONTINUE";
282 A$=INKEY$:IF A$=""THEN 282
284 GOTO 21
300 CLS:PRINT"INVENTORY SUMMARY":GOSUB 1000
310 PRINT"ITEM      QTY      $UNIT$      DATE      VALUE
320 FOR I=1 TO K:PRINT@ (I+1)*40,N$(I):PRINT@ (I+1)*40+9,Q(I)
330 PRINT@ (I+1)*40+15,WP(I):PRINT@ (I+1)*40+25,DT$(I)
340 PRINT@ (I+1)*40+32,Q(I)*WP(I):NEXT
360 PRINT"PRESS ANY KEY TO CONTINUE";
362 A$=INKEY$:IF A$=""THEN 362
364 GOTO 21
999 MENU
1000 OPEN "RAM:INVDTA.DO"FOR INPUT AS 1
1010 FOR I=1 TO 999:INPUT #1,N$(I),Q(I),WP(I),DT$(I)
1020 SOUND 4000,1:K=I:IF EOF(1) THEN GOTO 1030 ELSE NEXT
1030 CLOSE:RETURN
2000 OPEN"RAM:INVDTA.DO"FOR OUTPUT AS 1
2010 FOR I=1 TO K:SOUND 3000,1
2020 PRINT #1,N$(I),"Q(I)","WP(I)","DT$(I):NEXT:CLOSE:RETURN
```

We hope the programs in this chapter have convinced you that in production analysis, just as in real estate, stock investment, and many other areas, the Model 100 can be the businessperson's ideal helper.

8

CompuServe

CompuServe Information Services

- What is CompuServe?
- Hooking up
- Logging on
- CompuServe commands
- Quotations and investments
- Banking and brokerage services
- Financial news reports
- Electronic mail
- Special interest groups

One of the features that has made the Model 100 such a resounding success is its built-in modem and telecommunications program, TELCOM. With your Model 100 you can access other computers around the world, wherever the telephone lines go, with no additional equipment except a simple cable. The computer you call may be a mainframe or another micro-computer connected with your company or another company with which you do business, or it may be one of the many online databases that have sprung up to offer businesspeople and other computer users all kinds of valuable information. "Online" simply means that the mainframe computers that hold the information are available on the same "line" (in this case, the telephone line) as your computer. A database is a collection of different types of data, or information.

When you buy a direct connect modem cable for your Model 100 from Radio Shack (catalog number 26-1410), you will receive one hour of free hookup service on two of the largest commercial information networks in the country: CompuServe Information Service and Dow Jones News/Retrieval service. We'll talk about Dow Jones News/Retrieval in the next chapter. In this chapter, we'll take a look at CompuServe.

What Is CompuServe?

CompuServe, based in Columbus, Ohio, started over fourteen years ago as a data processing service for an insurance company. The company began to offer the services of its computer to large companies all over the country, and by 1975 it became an independent company with shares traded on the over-the-counter market. In 1980, CompuServe merged with H & R Block®. Today, it has its own communications network in hundreds of cities throughout the country so that individuals or companies can call it by dialing a local telephone number.

Many services valuable to the businessperson are available on CompuServe. They include daily stock quotations and commodity market reports. With electronic mail, a CompuServe user can send a message instantly to another user thousands of miles away. You can do your banking on CompuServe, too!

The services offered by CompuServe are so varied and numerous that we cannot give an exhaustive survey of them here. Furthermore, new services are being added every month. Look at the "CompuServe Information Service Subject Index" in the startup pack that comes with the Model 100 direct connect modem cable for current services offered.

We'll take you step by step through a few of the databases that are available to today's informed businessperson through CompuServe.

Hooking Up

Before you dial up CompuServe for the first time, you should read the *CompuServe Information Service User's Guide* that comes with the direct connect cable. With it you'll find a sealed envelope. Open it and you'll find your user identification number and your password. (If you are using an acoustic coupler, or some other hook-up which does not come with instructions for dialing up CompuServe, ask your dealer for information about these services.)

Once you have your I.D. number and your password, connect your Model 100 to the telephone lines. If you've never done this before, or if you're a little rusty, you might want to refer to *Introducing the TRS-80® Model 100* by Diane Burns and S. Venit (New York: Plume/Waite, New American Library, 1984) for detailed, step-by-step instructions. We'll summarize the steps below, both for the direct connection to a modular plug and for the acoustic coupler.

Using the Direct Connect Cable

Here is a summary of the steps needed to make the connection with the direct connection modem cable:

Direct Hookup

1. Insert the cylindrical end of the cable into the port marked "PHONE" on the back of your Model 100.
2. Remove the plug from the back of your touch-tone telephone and insert the gray cord from the cable. (Note that you *must* use a touch-tone telephone for this procedure to work.)
3. Plug the line removed from the back of the phone into the connector on the end of the beige cable.
4. Set the "DIR-ACP" switch to "DIR" and set the "ANS-ORIG" switch to "ORIG".

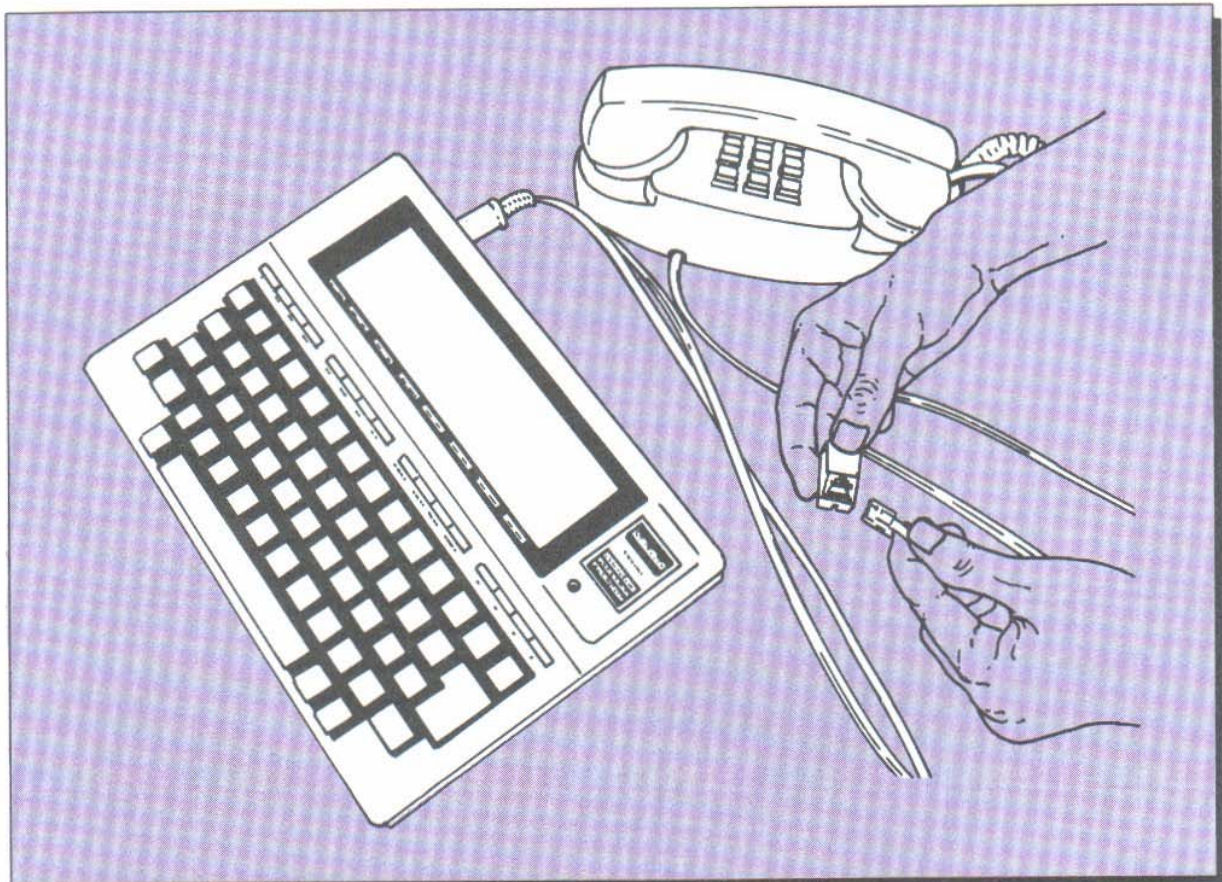


Figure 8-1. Connecting the Model 100 to the phone lines

Using the Acoustic Coupler

The acoustic coupler is used when a modular telephone jack is not available; it can be used with any standard telephone. Generally, the acoustic coupler does not provide the same interference-free communications as the direct connect cable does. Also, autodialing is not possible with the acoustic coupler.

Here is a summary of the steps needed to connect your Model 100 to the telephone lines with an acoustic coupler:

Acoustic Coupler Hookup

1. Insert the cylindrical end of the cable into the port marked "PHONE" on the back of your Model 100.
2. Slip the cup labeled "MOUTHPIECE" over the mouthpiece of your telephone receiver.
3. Slip the cup labeled "EARPIECE" over the earpiece of your telephone receiver.
4. Set the "DIR-ACP" switch to "ACP" and set the "ANS-ORIG" switch to "ORIG".
5. Place the phone receiver in the position shown in Figure 8-2.

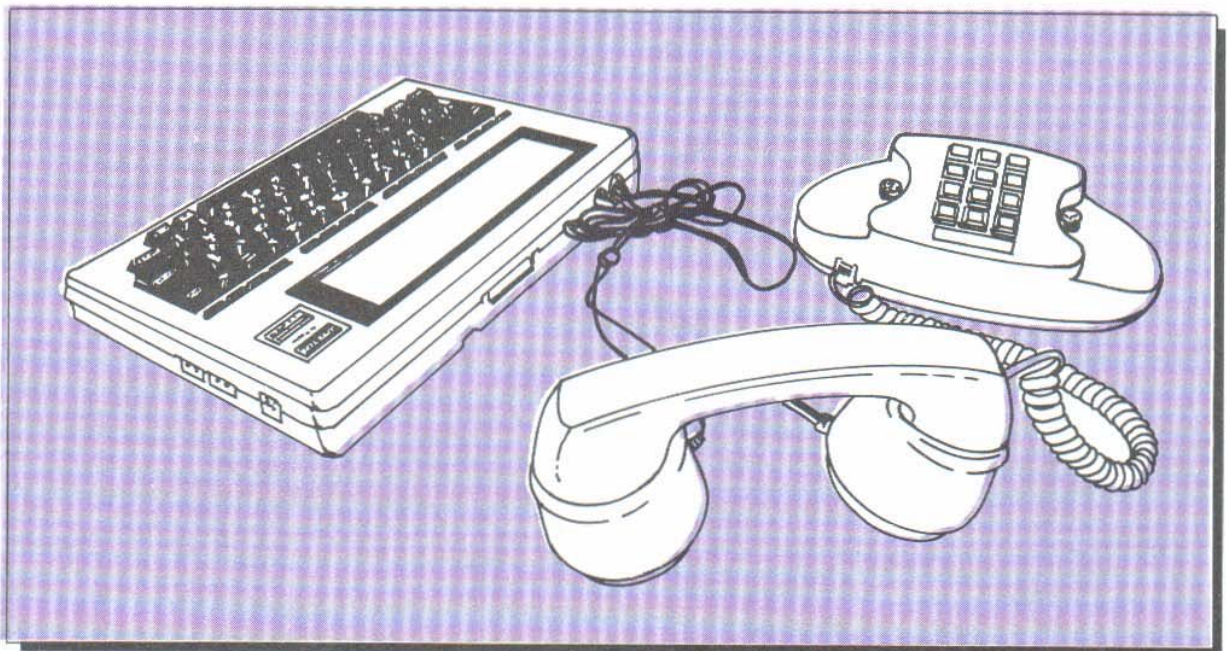


Figure 8-2. The acoustic coupler hook-up

Logging On

Once you've hooked up your Model 100, you can dial up CompuServe by selecting the TELCOM program on the main menu of the Model 100. Be sure your communications parameters are set correctly. The communications parameters are the speed of transmission (baud rate), the number of data bits, and other factors that define how your Model 100 will "talk" to the outside world. (For a more detailed look at communications parameters, see *Introducing the TRS-80® Model 100*.)

After you bring up TELCOM, your screen should look like this:



If your screen does not read this way, press Stat (F3), type in "M7I1E", then press (ENTER).

To dial up CompuServe, look at the sheet of telephone numbers that comes with the *CompuServe Information Service User's Guide* in the direct connect modem cable package. Find the number local to you. Press the Call function key (F2) and enter the telephone number, with no hyphen or spaces between the numbers.

Your Model 100 shows each digit on the screen as it's dialing. After the last digit appears, change to Terminal mode by pressing (F4). You should hear a high-pitched sound.

When the sound ends, type in (CTRL) C. You will then be asked for your user I.D. number. Enter it and press (ENTER). Then you will be asked for your password. Enter it and press (ENTER) again. For security reasons, your password will not appear on the screen.

The first thing you'll see is a series of announcements about services or news on the system. The information scrolls off the screen as it is received. To stop the scrolling, press (CTRL) A or (CTRL) S. Read the next section for more on CompuServe's control commands.

CompuServe Commands

CompuServe has a system of commands that are invoked by using *control characters*; that is, the **CTRL** key is held down at the same time another letter is pressed. Here is a summary of the the control character commands available:

CompuServe's Control Commands

- | | | |
|-------------|---|---|
| CTRL | C | Interrupts the display — you may switch to a new menu |
| CTRL | H | Backspaces |
| CTRL | A | Temporarily suspends output at the end of the current line (use CTRL Q to resume) |
| CTRL | S | Temporarily suspends output immediately, even in the middle of a line (use CTRL Q to resume) |
| CTRL | Q | Resume output |
| CTRL | O | Stops output — it may not be resumed |

Quotations and Investments

After reading the announcements, just press **ENTER** to get to the first menu. Here's what you'll see:

```
CompuServe          CIS-1

CompuServe Information Service

1  Home Services
2  Business & Financial
3  Personal Computing
4  Services for Professionals
5  User Information
6  Index

Enter your selection number
or H for more information!
```

There are two different ways to get to specific information on CompuServe. You can choose one of the menu option numbers, or you can type

GO n

where n is some "page" number of the CompuServe menu you want (for example, "CIS-1", as shown above). We'll give some examples of CompuServe page numbers later. If you know the CompuServe page number, you can save time online by using the "GO n" command.

To get to the business section of CompuServe, choose the option for "Business and Finance", selection number 2, by typing 2 **ENTER**. Then you'll see a menu like this one:

CompuServe Page FIN-1

BUSINESS AND FINANCIAL SERVICES

- 1 News & Financial Analysis
- 2 Investments & Quotations
- 3 Communications
- 4 Brokerage & Banking **CTRL** S

Remember, you can use **CTRL** S to stop the scrolling and **CTRL** Q to start again.

CTRL Q

- 5 Reference Library
- 6 Discussion Forums
- 7 Travel Services
- 8 Personal Finance

Last menu page, Key digit
or M for previous menu!

Let's choose number 2 for "Investments and Quotations".

INVESTMENTS & QUOTATIONS

- 1 MicroQuote
- \$ 2 Quick Quote
- \$ 3 Standard and Poor's Analyses
- 4 Value Line Data Base II
- 5 News-a-tron Commodities
- 6 Rapaport <<Diamond System>>

\$ Indicates charges in addition
to connect time may be incurred.

Last menu page, Key digit
or M for previous menu!

"The '\$' by some of the menu selections indicates you will be charged a fee in addition to your regular CompuServe fee for using those selections. This extra fee will be added to your CompuServe bill every month.

Suppose you decide to enter number 5 to select the "News-a-tron Commodities". The following screen will appear:

```
Request Recorded,  
One Moment, Please  
Thank You for Waiting  
CompuServe Page NAT-1
```

```
*****  
*                                     *  
*      News-a-tron Market          *  
*      Reports                     *  
*****  
* News-a-tron, a division of *  
* Herman Communications Corp.*  
*****  
News-a-tron provides authoritative  
news, analytical features and cash quotes  
for selected commodities, market indices  
and financial instruments. The reports  
are provided daily to give the reader  
timely insight into market action.  
  
Key S or <ENTER> to continueY,=!
```

The News-a-tron service is provided by Herman Communications Corporation, a news and features syndicate specializing in authoritative information on a variety of subjects. Their past emphasis has been on commodities and financial markets, but an extensive additional product line, now in the planning stage, will include political and economic risk analysis of various countries. News-a-tron provides opening calls from the floor of the New York Stock Exchange, cash prices through a survey of the cash markets, and fundamental analysis and technical analysis using its own software. Its technical analysis considers cycles, trends, oscillators, and volume. The fundamental analysis looks at the latest news stories and how that news affects trading on the floor of the exchange.

CompuServe Page NAT-1

News-a-tron

1 Introduction and Samples

2 Pricing Information

\$ 3 News-a-tron Market Reports

\$ 4 News-a-tron Indices

Y, JLast menu page, Key digit
or M for previous menu!

Maybe you've got some oil investments you'd like to check on. Then you might want to press the 3 key for number 3, "Market Reports".

CompuServe Page HCC-1

News-a-tron Market Reports

1 Daily Petro Analysis

2 Petro Crack and Rack Spreads

3 Metals Analysis and Cash Prices

4 Currency Cycle Analysis and Cash
Prices

5 Interest Rate Report

6 Yield Curve Analysis

7 Grains Report and Cash Prices

8 Forest Products Cash Prices

Y, JLast menu page, Key digit
or M for previous menu!1

From there, you might want to go to the "Daily Petroleum Analysis". If so, just push 1.

CompuServe Page HCC-5

News-a-tron Daily Petro Analysis
10:00 a.m. EST 02/02/84

	No.2 Oil	Gasoline	Crude	Propane
	Cents/ Gal.	Cents/ Gal.	Dlrs/ Barrel	Cents/ Gal.
NY	90.09	80.23	30.30	45.95
Close Mar.		Mar.	Mar.	Mar.

Open unchanged across the board
Key S or <ENTER> to continueY,=!

These are wholesale prices, of course!

Now maybe there are farming interests you'd like to look in on. If you have your CompuServe Subject Index sheet handy, you can take a short cut to the right menu. Simply type in the page number and go directly to the page with current grain prices.

Key S or <ENTER> to continueY,=! go hcc-55

CompuServe Page HCC-55

News-a-tron Daily Grain Report
10:00 a.m. EST 02/02/84

Cash grain prices:

	Current quote \$/Bu.
Wheat KC, No. 2	3.76
hard red	3.75 previous

Key S or <ENTER> to continueY,=! ENTER
CompuServe 4Page HCC-21

Corn Cent, Ill.	3.22
No. 2 yellow	3.20 previous

Soybeans Cent.	7.40
Ill. No. 1 yellow	7.30 previous

Sorghum \$per cwt.5.84
Gulf No. 2 Gulf 5.82 Previous

Key S or <ENTER> to continueY.=!

In addition to current quotes on a variety of stocks and commodities, CompuServe offers other important investment information. To see what these services are, return to the first News-a-tron menu by typing "go nat-4 ENTER" and then choose the option for "News-a-tron Indices".

CompuServe Page NAT-4

News-a-tron

- 1 Introduction and Samples
- 2 Pricing Information
- \$ 3 News-a-tron Market Reports
- \$ 4 News-a-tron Indices

Y. JLast menu page. Key digit
or M for previous menu!4

The following menu will then appear.

CompuServe Page OSC-1

News-a-tron Indices Analysis

- 1 Industrial Index Analysis
- 2 S&P Analysis
- 3 KC Value Line Analysis

Last menu page. Key digit
or M for previous menu!

These indices include Standard and Poor's, which provides up-to-date descriptive and financial information on more than 3,000 companies. The information includes a business summary, new product developments, net sales figures, and a product/service line breakdown.

Also available is the Value Line Data Base, which provides current and historical data that allow you to analyze the performance of more than 1,600 major industrial, transportation, utility, retail, banking, and insurance companies that collectively represent 95 percent of the dollar value of stocks traded on the exchanges. Information is available for as far back as 1969.

Banking and Brokerage Services

CompuServe offers online brokerage and banking services, too. From CompuServe's primary business menu (page FIN-1, pictured earlier), just choose "4 Brokerage and Banking". You will see a menu similar to this one:

CompuServe Page FIN-40

BROKERAGE SERVICES

- 1 Unified Management Corporation
- 2 Tickerscreen

ELECTRONIC BANKING

- 3 Huntington National Bank
- 4 Shawmut Bank of Boston
- 5 United American Bank, Memphis

Last menu page. Key digit
or M for previous menu!

Maybe you'd like the brokerage service on Tickerscreen. To find out, put in a number 2 and press **ENTER**.

Request Recorded,
One Moment, Please
Thank You for Waiting

Max Ule Page TKR-1

- Tickerscreen
The Financial Info Service
of Max Ule and Co., Inc.
- 1 Introduction
 - 2 NYSE Price Quotations
 - 3 Market Activity Summary

4 New Issues Calendar
5 Discount Brokerage Service
6 Order Free Brochures
7 Feedback to Max Ule
8 Maxi-Micro Software

Y, JLast menu page, Key digit
or M for previous menu!

Tickerscreen offers online services and information retrieval, including direct order entry of discount brokerage buy and sell orders, for clients of Max Ule and Company. We're going to look at the discount brokerage services offered.

Tickerscreen can provide closing stock quotations for 2,000 New York Stock Exchange securities (no OTC or AMEX). The database is created online by Max Ule's Tickertec systems during market hours and transferred to the CompuServe system via the VIDTEX file transfer program after the close each day. The information comes directly from the low-speed ticker-tape. No adjustments or corrections are made.

To acquire the closing price, daily high, and daily low of a security, you need only enter the ticker symbol of the stock. The random access search will require only a few seconds to retrieve a quote.

To receive a quotation, enter the standard ticker symbol (one to four characters). For a preferred stock, follow the symbol by '/', '/A', or whatever is appropriate. Then press **ENTER**.

A variety of online services is provided by Tickerscreen. If you choose "5 Discount Brokerage Service", a menu like this one will appear:

DIRECTORY OF DISCOUNT SERVICES PROVIDED BY MAX ULE

1 On-Line Order Entry
2 Commission Calculations
S 3 Savings and Service
S 4 IRA and Keogh Plan Accounts
S 5 Ginnie Mae Certificates
S 6 Soft Dollar Software
S 7 Rothschild, Earnings and
Liquidity (REAL) Fund
S 8 Stock Index Options Trading

Last menu page, Key digit

Max Ule is a division of Rosenkrantz, Ehrenkrantz, Lyon & Ross, Incorporated, members of the New York and American Stock Exchanges. They offer their services at a considerable discount over standard brokerage houses.

If you prefer, you can look at offerings of new stock coming to market. Just key M to get back to the Tickerscreen main menu, then choose number 4, the "New Issues Calendar". That list represents new issues in which Rosenkrantz, Ehrenkrantz, Lyon & Ross, Incorporated is taking part in the selling group.

Max Ule Page TKR-40

NEW ISSUE CALENDAR
AS OF February 3, 1984

ISSUE	INDICATION
LEAD UNDERWRITER	DATE

ASG Nuts & Bolts	N/A
L.F. Rothschild	Postponed

American Fructose	N/A
Drexel	Wk of 2/6/84

Financial News Reports

With CompuServe, you have some of the best financial news services in the country right at your fingertips. Use the "M" command to get back to the first page of Business & Finance and from there, choose "1 News and Financial Analysis" to get the following menu:

CompuServe Page FIN-10

NEWS/REPORTS

- 1 Business Information Wire
- 2 The Business Wire
- 3 MMS Financial Analysis
- 4 News-A-Tron Commodities
- 5 Stevens Business Reports
- 6 Evans Economics, Inc.

News services offered include the Business Information Wire, which provides stories gathered by reporters across Canada and from correspondents abroad. The wire service is updated continuously throughout the day by the Canadian press with the particular information requirements of the business community in mind.

Money Market Services (MMS) provides "The Daily Comment", which explores the technical aspects of market activity, from support and resistance trends to very sophisticated technical analysis. MMS also provides a bulletin, updated each Friday, which contains information and forecasts focusing on interest rate trends. "The Monthly Report" features long-term economic and monetary trends, enabling access to current and prospective debt market conditions.

The Business Wire provides press releases and news articles from the world of business. The service is updated continuously throughout the day and contains information on hundreds of different companies.

Several other services offered on CompuServe are of interest to the businessperson. We'll mention them briefly here; you can explore them in detail on your own.

Electronic Mail

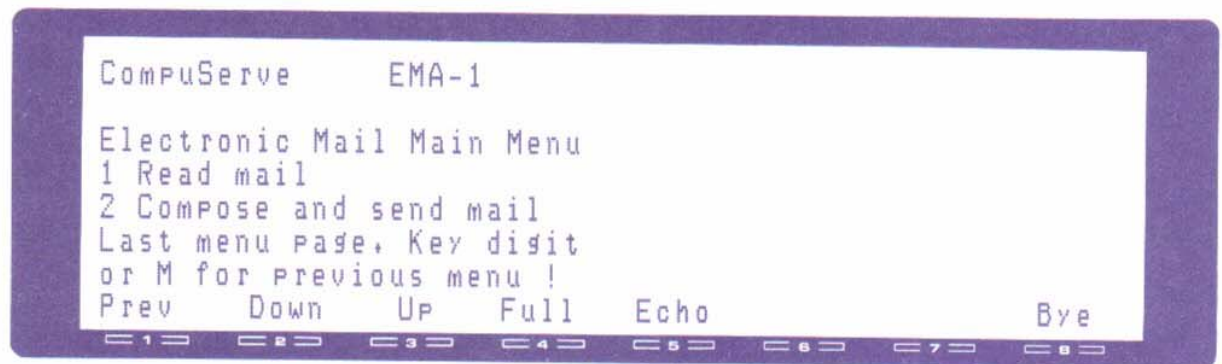
CompuServe has an Electronic Mail service that you can use to send and receive messages from any other CompuServe user in the nation. With Electronic Mail and your Model 100, your boardroom travels with you. The instant, accurate exchange of information among business associates can prove a valuable asset.

Here's a brief outline of the way Electronic Mail works. The simplest approach is to use the TEXT program of the Model 100 to compose your message. The TEXT program is much easier to use than the text editor provided on CompuServe.

From the main CompuServe menu, type GO PCS-71 and press **ENTER**. You'll see an "OK" appear on your screen. You're now ready to upload your text file from your Model 100 to your "diskspace" on CompuServe (you have up to 128K storage as part of standard service). Type "R FILGE **ENTER**". An asterisk appears on the screen. Type in the filename for the file on CompuServe. It doesn't have to be the same name as the file has on your Model 100. Press **ENTER**.

CompuServe will then tell you "NEW FILE filename CREATED". Press the Upload function key **F3**. When the Model 100 asks "File to Upload?" enter the filename, including the ".DO" extension. Enter the "Width" after the prompt. The width must be set to less than 79 to work on CompuServe.

The label "UPLOAD" will be in reverse video. When the file is completely transferred, the "UPLOAD" label will return to normal video. Your file is now on your disk space in CompuServe. To send the file, exit to Electronic Mail by typing "/EX ENTER". Then type in "R EMAIL ENTER". The following menu will appear:



Choose selection 2, "Compose and send mail". The following menu will appear:

```

CompuServe      EMA-5

Create a new message in your
temporary workspace using:
1 Filge editor
2 ICS editor
3 File from disk space
Edit message in workspace using:
4 Filge editor
5 ICS editor
6 Send message from workspace
7 Information on Filge
8 Information on ICS
Last menu page. Key digit
or M for previous menu !3
  
```

By choosing number 3, "File from disk space", you will create a new file in the Electronic Mail workspace by taking a file from your CompuServe disk space.

You will then get a series of prompts. Answer them as follows:

```
Name the input file, ? for HELP,  
or <ENTER> to quit  
:filename          ← Disk space filename
```

```
Workspace Loaded from disk:filename
```

Press **ENTER** and the Electronic Mail Main Menu will appear. This time choose option 6, "Send message from workspace". This will allow you to take the file that's now in your workspace and send it to another CompuServe user (you have to know the user's I.D. number). Answer the next series of prompts:

```
Send to User ID  
:77777,7777
```

```
Subject (32 Characters max)  
:Describe the topic
```

```
Your name (32 Characters max)  
:type your name
```

```
Is this correct?(Y/N)  
:Y
```

```
Message awaiting delivery
```

That's all there is to it! You might experiment by sending yourself a message. The possible applications for this service are tremendous. You have a sophisticated communications network at your fingertips. Whether your business is large or small, you can stay in the know with Electronic Mail.

Special Interest Groups

CompuServe makes available Special Interest Groups (SIGs), which allow CompuServe users with like interests to exchange news and information. SIGs range from Aviation Groups to Computer Groups to Photographers' Groups.

Many of the submenu categories offer discussion forums with the group sponsoring the service. For example, you may recall that the Tickerscreen menu included an option for "Feedback" (selection 7). These discussion options give you an opportunity to ask questions and state your interests.

There are also personal computing SIGs. Type "GO PCS-50 **ENTER**" at the "!" prompt, and you will see the following menu:

```
CompuServe          Page PCS-50

    Personal Computing SIGS

1 CP/M SIG          11 PowerSoft's
2 HUG (Heath)       12 Programmer's
3 MAUG (Apple)      13 CEM SIG
4 MNET-11(H11)      14 Author Forum
5 MUSUS P-sys.      15 Commodore
6 RCA micros        16 Atari SIG
7 TRS80 COCO        17 IBM PC SIG
8 Panasonic         18 OSI SIG
9 MNET80 TRS80      19 Instructions
10 LSI Users         20 Descriptions
Input a number or key
<ENTER> for more choices !
CompuServe          Page PCS-100
```

```
    Personal Computing SIGs

1 MicroSoft Users Group
2 Telecommunications SIG
3 TRS-80 Model 100 SIG
4 Computer Art SIG
5 VAX SIG
6 OS9 Forum
7 TRS-80 Professional Forum
8 EpsOnLine
9 Whole Earth Software
```

The Model 100 SIG is one of the fastest growing, most exciting SIGs on CompuServe. Just type "GO PCS-100 **ENTER**" at the "!" prompt and choose the selection 3, "TRS-80 Model 100 SIG". You'll find all kinds of interesting tips and lots of programs good for businesses that you can download and use.

As you can see, CompuServe offers a wide variety of services and opportunities for the professional. Services that in the past were available only to large corporations are now within the reach of every business, large or small. From stock market quotes to electronic mail, the power of your Model 100 can now include the wide, wonderful world of information networks.

Dow Jones — Window on Wall Street

Dow Jones News/Retrieval

- Historical perspective
- Logging on
- Quotation services
- Financial news services
- Investment services
- Logging off

It was over 100 years ago that three resourceful reporters, Charles Dow, Edward Jones, and Charles Bergstresser, began to collect and disseminate daily news of the Wall Street scene. In 1882, Dow Jones & Co. was formed, and in 1889, the company's four-page flimsies became known as the *Wall Street Journal*.

Eventually, the company initiated the Dow Jones News Service, which used the technology of the telegraph to spread the news of Wall Street with increased speed. By 1931, high-speed tickers sent the news at an amazing sixty-five words per minute, and by 1964, corporations all over the country, in over 600 cities, were receiving news from Dow Jones.

Around 1977, the incredible data-base that Dow, Jones, and Bergstresser had started was made available to individuals. Through cooperative agreements with Tandy Corporation and other microcomputer manufacturers, the Dow Jones News/Retrieval service as we know it today began to take shape. Now this service is one of the most widely used information services in the country. In 1983, it provided almost a quarter of a million subscribers with access to over twenty-five different databases. It has become an invaluable tool for investors, both large and small.

The Dow Jones News/Retrieval service is not only for the investor. The available databases cover everything from daily news headlines to ratings of the top-earning movies to airline schedules. Each can be accessed simply by typing in “//”, followed by the symbol for the database you want.

Room service taking too long with your newspaper and coffee? Plenty of news is available through The Wall Street Journal Online (//WSJ). (No coffee, though.) Christmas or Aunt Matilda’s birthday got you down? Find just the right gift through Compu-U-Shop (that’s //STORE). Flying to Boston tomorrow? Check out the weather in //WTHR. There is a multitude of other services available, too.

If you *are* an investor, with Dow Jones News/Retrieval and your Model 100, you have your own personal financial research department. The Dow Jones News/Retrieval service offers more financial information than any other publicly available database.

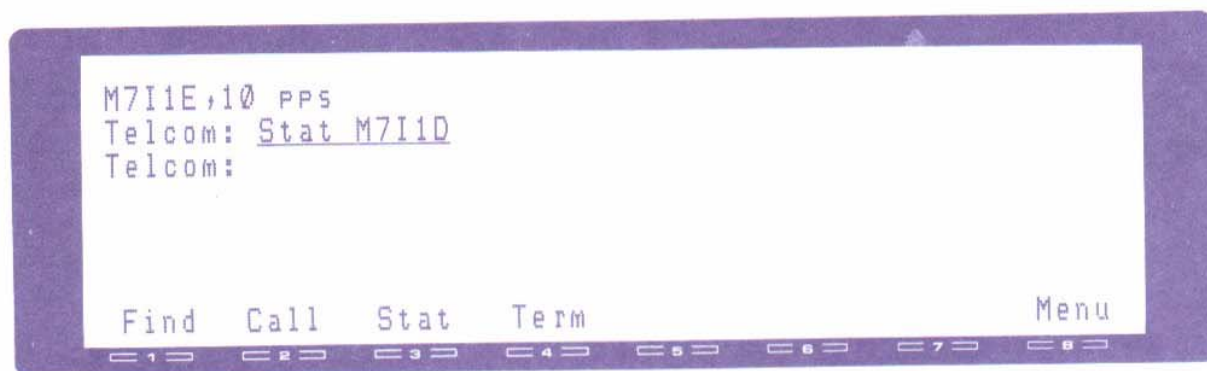
We’ll discuss many of the databases in detail in later sections of this chapter. But first, let’s see how to dial up Dow Jones and get comfortable moving among the various services.

Getting Started

Before you can dial up Dow Jones News/Retrieval for the first time, you must call customer service at the number provided with the *Dow Jones News/Retrieval User’s Guide*, which comes in your direct connect modem cable package. You will be given a temporary password, along with a local telephone number.

Next, connect your Model 100 to the telephone lines, using either the direct modem cable or the acoustic coupler. The previous chapter provided instructions for doing this. (Note that if you use an acoustic coupler, you will not be able to use the auto logon procedure.)

Dialing up Dow Jones is similar to dialing other information services. Enter the TELCOM program on the Model 100. The communications parameters are slightly different from those used to dial CompuServe, so use the Stat function key (F3) to set the parameters to M7I1D.



Logging On

Once the communications parameters have been properly set, use the Call function key (F2) to dial your local number to access Dow Jones News/Retrieval (or use the Find function key (F1) if you've included the number in your ADDRSS.DO file).



When dialing is complete, you'll hear a high pitched tone. Enter the terminal mode with (F4).

When the connection is made, you will see the labels at the bottom of your Model 100 screen change as the definition of the function keys changes. You will then be asked to "TYPE IN YOUR TERMINAL IDENTIFIER". For the Model 100, that's the letter "A". Do *not* press (ENTER).

Now you will be asked to "PLEASE LOG IN". Type in "(CTRL)RDOW1;," but again, do not press (ENTER). The "(CTRL) R" is entered by holding down the (CTRL) key and pressing the letter "R" at the same time. Entering the "(CTRL) R" allows you to take advantage of the Dow Jones News/Retrieval control key commands when you're online. Note that the (CTRL) R and the second semicolon do not appear on your screen.

When you see the prompt "WHAT SERVICE PLEASE?", type in "DJNS" and this time, press (ENTER).

```

Please type your terminal identifier A
Please log in: (CTRL) RDOW 1;; tc>
host is online

WHAT SERVICE PLEASE???
DJNS
Prev Down Up Full Echo Bye
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```

The host system will then ask you to “ENTER PASSWORD”. Type in your password and press (ENTER). You are now connected to Dow Jones News/Retrieval. A copyright message will scroll across your screen, followed by some general announcement or news story:

```

MERRILL LYNCH RESEARCH SERVICE
(//MLYNCH) AVAILABLE: SEE
FREE TIME OFFER IN //INTRO,
DATA-BASE LIST IN //MENU,
ENTER QUERY

```

If you have any questions about logging onto or using the Dow Jones News/Retrieval service, use the Customer Service 800 telephone number in your *User's Guide*. A staff of people is available to help you solve any problems you may encounter in using the service.

The following control codes will allow you to control the information coming in:

Dow Jones News/Retrieval Control Commands

(CTRL)	S	Stop scrolling
(CTRL)	Q	Begin scrolling
(CTRL)	H	Character erase
(CTRL)	W	Erase word
(CTRL)	X	Erase line
(CTRL)	R	Replay line

Quotation Services

By typing in a comma, then the company symbol, you can get quotes on the trading price of thousands of stocks. New York, American, Pacific, and over-the-counter stocks are included. Let's suppose you want to know about the stock of one of the imaginary companies we met in Chapter 6, QP Doll Company. Its company symbol is *qpdc*.

ENTER QUERY

,qpdc (ENTER)

STOCK	BID	ASKED
CLOSE	OPEN	
LOW	LAST	VOL(100'S)
QPDC	37 5/8	37 1/4
	5436	

The screen will show the current day's quotes. There is a minimum fifteen minute delay between these prices and the actual current price on the floor of the exchange.

On a 40-column screen this may look a bit disorganized, to say the least. Actually, it's not that hard to figure out. Although headings for STOCK, BID, ASKED, CLOSE, OPEN, LOW, LAST, and VOLUME are displayed, they are printed on three lines because they won't all fit in a single 40-column line. Also, not all this data is available. Only the STOCK, which is QPDC, the BID and ASKED prices, which are $27\frac{5}{8}$ and $27\frac{1}{4}$, and the VOLUME, which is 5436, actually appear on the screen.

Composite price information is available on common and preferred stocks and warrants from all major exchanges, including over-the-counter stocks. Quotes from the national over-the-counter market (NASDAQ) are updated six times daily.

You can get quotes on other types of securities by responding with the following prompts when "ENTER QUERY" appears on the screen.

- / symbol Corporate and foreign bonds
- + symbol Mutual funds
- symbol Options
- # symbol U.S. Treasury issues

Refer to *The Dow Jones News/Retrieval Fact Finder* or type "//SYMBOLS" at the query prompt to find the symbol for the security you want to investigate.

Capturing the Information

There are several ways to get a record of information from Dow Jones News/Retrieval with your Model 100. You can attach the Model 100 to a printer, and by pressing **(F5)**, the Echo function key, you'll get a hard-copy printout of the information coming across your screen.

Alternatively, you can transfer the information coming across the screen into the Model 100's memory. Simply press the Download function key **(F2)**, and when the Model 100 prompts "Filename?", type in any six-letter filename with the extension ".DO". The label "Down" will appear in reverse video, and the information will be saved into memory. Make sure you have enough memory space for the incoming material.

Historical Quotes

It's easy to get historical quotes to see how a stock's price has changed over a period of time, say, two weeks. Refer to the *Dow Jones User's Guide* for the right code to use.

iqpdc p1 **(ENTER)**

DOW JONES HISTORICAL
STOCK QUOTE REPORTER SERVICE

STOCK QPDC

DATE	BID	ASKED	CLOSE
VOL(100/S)			
12/28/83	24 7/8	25	
5739			
12/29/83	24 1/2	24 5/8	
4587			
12/30/83	24 1/4	24 3/8	
4101			
01/03/84	25 5/8	25 3/4	
6705			
01/04/84	37 3/4	38	
13063			
01/05/84	38 1/8	38 1/4	
13648			
01/06/84	37 5/8	37 3/4	
7522			

It's also possible to check the movement in the stock market as a whole by typing "//DJA". This accesses the Historical Dow Jones Averages database, which provides daily summaries of the transportation, industrials, utilities, and 65 Dow Jones Averages. You can ask for averages for a single day or for a twelve-business-day period.

News Services

Maybe you'd like to know what happened to make a stock's price change suddenly — as QP Doll's seems to have done around New Year's. Dow Jones News/Retrieval can help you with that, too. Just type in:

.QPDC 01

```
N  QPDC      01/03
BG 01/16 QPDC SETS $90 MILLION BUDGET
   (DJ) TO ADVERTISE SMALLEST DOLL
BF 01/13 FUNCLAIR RESEARCH UNVEILS
   (WJ) LOW-COST DOLL
BE 01/09 PANEL PICKS MORE STOCKS
   (BN) TO BUY AND SELL IN 1984
BD 01/04 QP DOLL SETTLES
   (DW) $2.5 MILLION SUIT WITH ACME
BC 12/23 LEADING DOLLWARE FIRM SEEKS
   (WJ) TO RAISE ITS IMAGE AMONG USERS
BB 12/22 ACME SAYS U.S. PROBE YIELDS
   (WJ) ABOUT 400 COPIES OF DOLL
BA 12/19 ACME DOLL WINS TEMPORARY
   (DJ) ORDER AGAINST EXTRA DOLL
AY 12/15 QPDC UP ON HEAVY VOLUME DUE
   (DJ) TO HAMBRILL RECOMMENDATION
AX 12/15 MORE FIRMS PUT THEIR LOGOS
   (WJ) ON WIDENING RANGE OF ITEMS
AW 12/09 ACME DOLL DEALT BLOW
   (WJ) IN AUSTRALIAN TRADEMARK CASE
```

This service show you a list of all the stories received by Dow Jones News/Retrieval on the stock whose symbol you type in — in this case, QP Doll Company. You can print out or download whatever stories you want to see.

This listing of headlines is part of the Dow Jones News database (//DJNEWS). These are the same stories you'll see in the pages of the *Wall Street Journal*, *Barron's*, and the Dow Jones News Service Broad tape. News is taken off the UPI wire. Stories may be as recent as ninety seconds or as old as ninety days.

To access a story from the headline list, simply type in the two-letter code that appears to the left of the headline. To get the story on "QPDC Sets \$90 Million Budget to Advertise Smallest Doll", for example, enter "BG":

```
N QPDC      01/03 BG 1/4
/IBC  QPDC      /DOLL  /
01/16 QPDC SETS $90 MILLION BUDGET
(DJ) TO ADVERTISE SMALLEST DOLL
N Y -DJ- QP DOLL COMPANY WILL SPEND
AN ESTIMATED $90 MILLION THIS YEAR TO
ADVERTISE ITS SMALLEST DOLL,
QPDC, WHICH WILL BEGIN SHIPPING ITS
LONG-AWAITED BABY QP THIS MONTH, SAID IT
WILL OPEN THE ADVERTISING CAMPAIGN NEXT
MONDAY DURING THE SUPERBRAWL. A
20-SECOND TV COMMERCIAL WILL FEATURE
A CHORUS OF THE DOLLS SINGING,
THE COMPANY WON'T SAY HOW MANY
DOLLS IT WILL SHIP THIS MONTH, BUT
SOME OF ITS 1,000 AUTHORIZED DEALERS
SAY THEY EXPECT TO RECEIVE 10,000 IN
JANUARY AND 15,000 IN FEBRUARY,
BROADTAPE 8 25 AM, JANUARY 16
```

NO PAGE

Free Text Search

You also have another way to keep up with stock history. With Free Text Search, you can look up almost anything. If the material you need for your research appeared more than ninety days previously, you might want to use this service. You can find a story by using words, names, phrases, numbers, or dates that might have appeared in the headline or the text of the article.

To access the Free Text Service, enter //FTS from the main menu. When you see the "Query" prompt, enter the topic you want to see stories on. You can enter a company name or symbol or any word or number. If you want to search for two topics, use the word "and":

//fts

```
DJ/NRS - SEARCH MODE - ENTER QUERY
1_:      QP Doll and Braxton
```

```
RESULT          2 DOCUMENTS
```


This search looks for all the articles containing the words “QP Doll” and “Braxon”. Suppose the search turns up two articles. To see the articles, type in “..p”:

```
2_ :      .+P

          DOCUMENT=      1
HL      MEANING OF 'QP COMPATIBLE'
VARIES IN DIFFERENT CHILDREN
DD      02/03/82
SO      WALL STREET JOURNAL (J)
TX      DOZENS OF CHILDREN CLAIM
THEY ARE 'COMPATIBLE' WITH THE
NEW MICHAEL BRAXON DOLL, THEY
CLAIM THE DOLL LOOKS JUST LIKE
THE SUPERSTAR HIMSELF, IN OHIO,
```

The top portion of the screen shows where and when the story appeared.

To see the second story, press **ENTER** at the end of the first story, and so on. To begin another search, enter ..S followed by a new topic.

Other News Services

Another important news service is the Weekly Economic Update (//UPDATE), a five-part database compiled by the editors of Dow Jones News/Retrieval. This database provides you with a look at the week's important economic news, statistical analysis of the past week's economic events, and a look at the month ahead.

Don't have your daily *Wall Street Journal*, or you're just tired of getting newsprint all over your fingers? Type //WSJ for the Wall Street Journal Highlights. You can view the headlines and summaries of major stories as early as 7 a.m. (Eastern time) each business day. You have the option of selecting a particular section that interests you or the entire online edition. The five most recent issues are available.

Talk about having a library at your fingertips! In the past, obtaining this kind of information would have taken hours or even days and would have cost a fortune. Now, it's instantly available. With your Model 100, you really do have your own research department.

Investment Services

You can get financial statistics on just about any company, too. If you're still interested in QP Doll, just type in:

\$qpdc/f

MEDIA GENERAL-FINANCIAL
SERVICES, INC.,
MARKET AND FUNDAMENTAL DATA ON
COMMON STOCKS AND RELATED
SUMMARY MATERIAL ON INDUSTRY
GROUPS, COPYRIGHT (C) 1984,

TO CONTINUE, TYPE THE PAGE
NUMBER YOU WISH AND PRESS
RETURN

1

QP DOLL COMPANY
-FUNDMNTL DATA- 01/13/84 (170)
REVENUE (1)
-LAST 12 MOS \$982 MIL
-LAST FISCAL YEAR \$683 MIL
-PCT CHANGE LAST QTR 66.4%
-PCT CHANGE YR TO DATE 68.6%
EARNNGS 12MOS \$76.7F MIL
EARNINGS PER SHARE
-LAST 12 MONTHS \$1.28
-LAST FISCAL YEAR \$1.28
-PCT CHANGE LAST QTR -76.0%
-PCT CHANGE FY TO DATE 20.8%
-PCT CHANGE LAST 12MOS 20.8%
-FIVE YR GROWTH RATE 63.0%

Media General is just one of the many companies that offer their services on Dow Jones News/Retrieval. They've been online with Dow Jones since 1980. Media General provides detailed corporate information on over 3,200 companies and 200 industries, with over fifty statistical indicators. The database is divided into two segments, one on price and volume data and one on fundamental data such as revenues, earnings, dividends, ratios, and shareholdings. In the above example, we asked for fundamental data. For price and volume information, just substitute a "p" for the "f" in the query response: \$qpdc/p.

You may ask for online help at any point. Simply type in the database you're interested in, followed by a space and the word "help". Here's part of the "Help" screen for Media General Services:

//medgen help

How To Obtain Media General
Financial Services From
Dow Jones News/Retrieval

To enter the Media General
Financial Services data base,
type __MEDGEN and press the
Return key. The terminal will
print "ENTER QUERY." The data
base consists of two sections
for each company and industry,
stock price and volume data and
fundamental data. To obtain
price and volume data, type the

-more-

Another important service for serious stock watchers is the Corporate Earnings Estimator. Updated weekly, this database provides consensus forecasts of earnings per share for over 3,000 companies. Over 1,000 research analysts at sixty major brokerage houses contribute to the estimates.

//earn

CORPORATE EARNINGS ESTIMATOR
ZACKS INVESTMENT RESEARCH INC.
CHICAGO, ILL.

FOR CONSISTENCY, ESTIMATES ARE
CONVERTED TO PRIMARY EARNINGS
BEFORE EXTRAORDINARY ITEMS.

PLEASE ENTER DESIRED STOCK
SYMBOL AND PRESS RETURN 9pdc

```

QP DOLL COMPANY
--FISCAL YEAR ENDS    9/84

EARNINGS PER SHARE ESTIMATES
--MEAN      0.77
--HIGH      1.76
--LOW       0.40
NUMBER OF ANALYSTS    21
P/E RATIO (ESTIMATED EPS)  36.76

PAST EARN PR SH ESTIMATES (MEAN)
--WEEK AGO      0.77
--13 WEEKS AGO  1.83
--26 WEEKS AGO  2.49

```

Another valuable source of corporate information is found in the Disclosure II (//DISC) database. You can look here for extracts of a variety of information filed with the Securities and Exchange Commission. It includes extracts of SEC filings on more than 6,000 publicly held corporations.

The Forbes Directory (//FORBES) ranks the largest U.S. corporations by sales, profits, assets, and market value. It also provides profitability and growth rankings for forty-six industries.

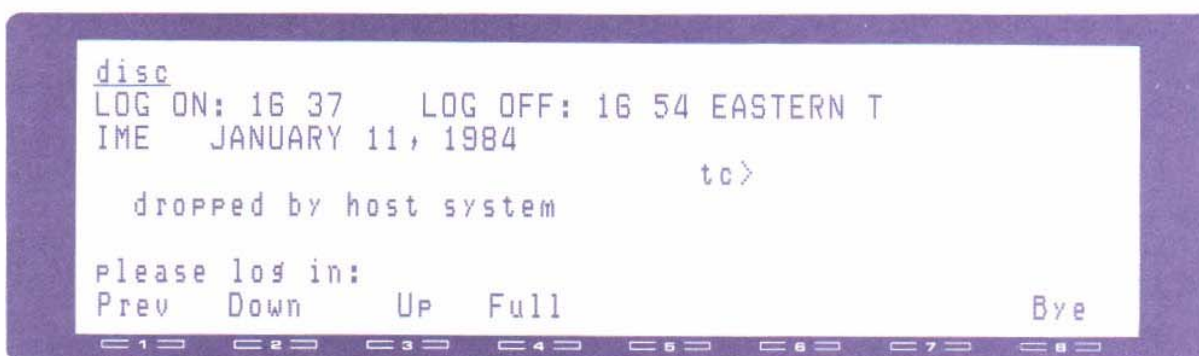
A recent addition to the Dow Jones News/Retrieval service is the Merrill Lynch Weekly Research Highlights (//MLYNCH). This service provides summaries of all research comments issued during the most recent four weeks. You may choose Market Analysis, which shows the headline and date from each of the weekly market comments, or Recommendations for Investment Action, which shows an alphabetical list of companies on which some investment action has been recommended. In both cases, you can choose the stories or companies that interest you.

For the supersophisticated, there's the Money Market Services (//MMS) database. This service is provided by Money Market Services, Inc., a multinational corporation that has been closely watching the Federal Reserve since 1974. They are experts in predicting money supply and monetary trends.

Logging Off

Don't be in too much of a hurry to leave Dow Jones News/Retrieval. It has lots of services we haven't even touched on. There are online shopping (//STORE), sports reports (//SPORTS), general news (//NEWS), movie re-

views (//MOVIES), and weather reports for fifty major cities (//WTHR), and more. When you're really ready to go, though, you can sign off from Dow Jones simply by typing **DISC** (ENTER):



After you've been "dropped by the host system", disconnect your Model 100 by pressing the Bye function key (F8). When the screen asks if you want to "Disconnect?", enter "Y" and press (ENTER).

Well, there you have it: powerful databases, investment analysis, balance sheets, real estate, charts and graphs, and much, much more — all at your fingertips with your Model 100!

We hope this book has given you plenty of programs and information that are just right for your business. Even more, we hope it has given you ideas of your own about things to do with this exciting little machine. We expect you'll soon be making modifications to our material or devising completely different ways to let the Model 100 increase convenience and profitability for you. The possibilities are endless!

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To order, use the convenient coupon on the next page.



(0452)

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WA

PRACTICAL FINANCE ON THE TRS-80[®] MODEL 100

Get the power of your desktop computer—anywhere! Here is the perfect guide for the businessperson on the move.

This book contains a comprehensive set of practical business programs for your Model 100 that will help you figure interest on loans or savings accounts, analyze stocks and bonds, calculate discounts and rates of return, make lease-versus-buy decisions, and perform a myriad of other business functions. Written in a no-nonsense, easy-to-understand style, the book explains when to use a particular program, as well as exactly how to operate it.

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ISBN 0-452-25576-7